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MAKE TOMORROW, TODAY

LOCAL AUTHORITIES PENSION PLAN

REPORT ON THE ACTUARIAL VALUATION FOR FUNDING PURPOSES AS AT DECEMBER 31, 2016

12 DECEMBER 2017

MARSH & McLENNAN COMPANIES

Note to reader regarding actuarial valuations:

This valuation report may not be relied upon for any purpose other than those explicitly noted in the Introduction, nor may it be relied upon by any party other than the parties noted in the Introduction. Mercer is not responsible for the consequences of any other use. A valuation report is a snapshot of a plan's estimated financial condition at a particular point in time; it does not predict a pension plan's future financial condition or its ability to pay benefits in the future. If maintained indefinitely, a plan's total cost will depend on a number of factors, including the amount of benefits the plan pays, the number of people paid benefits, the amount of plan expenses, and the amount earned on any assets invested to pay the benefits. These amounts and other variables are uncertain and unknowable at the valuation date. The content of the report may not be modified, incorporated into or used in other material, sold or otherwise provided, in whole or in part, to any other person or entity, without Mercer's permission. All parts of this report, including any documents incorporated by reference, are integral to understanding and explaining its contents; no part may be taken out of context, used, or relied upon without reference to the report as a whole.

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.

Decisions about benefit changes, granting new benefits, investment policy, funding strategy, 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 Public Sector Pension Plans Act, the Income Tax Act and related regulations, and the Employment Pension Plans Act and related regulations that are effective as of the valuation date. Mercer is not engaged in the practice of law or tax advice. This report does not constitute and is not a substitute for legal or tax advice.

The Board is responsible for developing a statement of investment policy and goals (SIP&G) to establish the investment principles, policy guidelines and manner in which the assets of the plan shall be invested and managed. The President of the Alberta Treasury Board and Minister of Finance has a duty to invest the assets in accordance with this SIP&G and applicable legislation. The investment functions of the Minister are performed through Alberta Investment Management Corporation.

CONTENTS

1

Summary of Results

($000,000's)	31.12.2016	31.12.2015
Going Concern Financial Status		
Adjusted market value of assets	$37,739.4	$34,430.3
Asset smoothing adjustment	($1,159.2)	$294.0
Smoothed value of assets	$36,580.2	$34,724.3
Going concern actuarial liability	$38,839.5	$36,904.9
Funding excess (unfunded liability)	($2,259.3)	($2,180.6)
Funded ratio – market value basis	97.1%	93.3%
Funded ratio – smoothed value basis	94.2%	94.1%
Solvency Financial Position		
Adjusted market value of assets, less wind-up expenses	$37,674.4	$34,365.3
Solvency liability	$53,182.8	$49,388.3
Solvency excess (deficiency)	($15,508.4)	($15,023.0)
Solvency ratio	70.8%	69.6%
Funding Requirements (annualized)[1]	**2017**	**2016**
Total current service cost	$1,880.2	$1,792.8
Non-investment related expenses	$39.5	$38.0
Total actuarial normal cost	$1,919.7	$1,830.8
Estimated pensionable salary	$10,937.5	$10,358.3
Normal cost (% of Pay)	17.55%	17.67%
Unfunded liability payments (% of Pay)	4.61%	6.49%
Total contributions (% of Pay) [2]	22.16%	24.16%
Next required valuation date	31.12.2019	31.12.2018

[1] Provided for reference purposes only. Contributions must be remitted to the Plan in accordance with the Funding Requirements section of this report.

[2] These are the total contribution rates effective January 1, 2019 and January 1, 2018, respectively. Based on the results of the December 31, 2016 actuarial valuation, the Minister approved the recommendation of the Board of Trustees to reduce the total contribution rate to 22.16% of pay effective January 1, 2018. Further details are provided in Section 5 of this report.

2

Introduction

To the Local Authorities Pension Plan Board of Trustees

At your request, we have conducted an actuarial valuation of the Local Authorities Pension Plan (the "Plan"), as at the valuation date, December 31, 2016. We are pleased to present the results of the valuation.

Purpose

The purpose of this valuation is to determine:

- The funded status of the Plan as at December 31, 2016 on going-concern and solvency bases; and

- The range of permissible funding contributions pursuant to the *Public Sector Pension Plans Act* and the *Income Tax Act* for the triennial period beginning January 1, 2017.

The information contained in this report was prepared for the internal use of the Board of Trustees and for filing with the Canada Revenue Agency, in connection with our actuarial valuation of the Plan. This report will be filed with the Canada Revenue Agency. This report is not intended or suitable for any other purpose.

In accordance with applicable pension benefits legislation, the next actuarial valuation of the Plan will be required as at a date not later than December 31, 2019, or as at the date of an earlier amendment to the Plan.

Terms of Engagement

In accordance with our terms of engagement with the Board of 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 Board of Trustees, the going concern discount rate reflects a margin for adverse deviations of 1.00% per year.

Events since the Last Valuation at December 31, 2015

Pension Plan

There have been no special events since the last valuation date.

This valuation reflects the provisions of the Plan as at December 31, 2016. We are not aware of any pending definitive or virtually definitive amendments coming into effect during the period covered by this report. The Plan provisions are summarized in Appendix F.

Assumptions and Methods

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**
Asset smoothing method:	Smooth all investment returns over 5 years	Smooth equity-only investment returns over 3 years
Nominal discount rate:	5.30% per year	5.25% per year
Commuted value basis discount rate:	1.5% per year for the first 10 years and 2.2% per year thereafter	1.6% per year for the first 10 years and 2.6% per year thereafter
Salary escalation:	2.00% per year for 3 years, 3.00% per year thereafter, plus Age-Based Merit and Promotion Scale	2.75% per year for 3 years, 3.00% per year thereafter, plus Age-Based Merit and Promotion Scale
Non-investment related expenses	$39.5 million	$38.0 million

The solvency assumptions have been updated to reflect market conditions at the valuation date.

A summary of the going concern and solvency methods and assumptions are provided in Appendices C and D, respectively.

Regulatory Environment and Actuarial Standards

The Government of Alberta enacted legislation exempting certain public sector pension plans from funding solvency deficiencies effective January 1, 2003. The funding requirements of the Plan incorporated in this valuation report reflect this legislation.

We are not aware of any changes to the *Public Sector Pension Plans Act* which impact the funding of the Plan.

Subsequent Events

The Canadian Institute of Actuaries Task Force on Mortality Improvement (Task Force) released a report, in draft form in April 2017 and in final form on September 20, 2017,which recommends that Canadian actuaries consider the selection of mortality improvement scale MI-2017 for the purpose of reflecting future mortality improvement in Canadian actuarial work, while indicating that it might be appropriate to make adjustments to mortality improvement assumptions to reflect the nature of the work. We will review the mortality improvement scale in the next valuation.

On July 20, 2017, the Canadian Institute of Actuaries released an Exposure Draft with proposed changes to the standards for pension commuted values (“Section 3500”). The impact of any changes to Section 3500 will be considered in a future actuarial valuation, once the amendments are finalized.

On November 15, 2017, as per Order in Council 385/2017, Lieutenant Governor in Council made the Local Authorities Pension Plan (2018 Contribution Rate Changes) Amendment Regulation which is summarized as follows:

- employee contributions rates were changed to be 9.39% on Pensionable Salary up the YMPE plus 13.84% on Pensionable Salary in excess of the YMPE; and

- employer contributions rates were changed to be 10.39% on Pensionable Salary up the YMPE plus 14.84% on Pensionable Salary in excess of the YMPE.

The above was filed under The Regulations Act as Alberta Regulation 209/2017 and comes into force on January 1, 2018.

After checking with representatives of the Local Authorities Pension Plan, to the best of our knowledge there have been no other 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.

3

Valuation Results – Going Concern

Financial Status

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:

($000,000's)	31.12.2016	31.12.2015
Assets		
Market value of assets	$37,722.9	$34,419.6
Asset smoothing adjustment	($1,159.2)	$294.0
Present value of prior service payments	$16.5	$10.7
Smoothed value of assets	$36,580.2	$34,724.3
Going Concern Actuarial Liability		
· Active members	$22,150.1	$21,432.1
· Pensioners and survivors	$15,002.1	$14,020.0
· Deferred pensioners and hold-on deposits	$1,687.3	$1,452.8
Total	$38,839.5	$36,904.9
Funding excess (unfunded liability)	($2,259.3)	($2,180.6)
Funding ratio	94.2%	94.1%

The going concern actuarial liability includes a provision for adverse deviations.

Reconciliation of Financial Status ($000,000's)

Funding excess (unfunded liability) as at previous valuation		($2,180.6)
Interest on funding excess (unfunded liability) at 5.25% per year		($114.5)
Special payments towards unfunded liability		$704.9
Expected funding excess (unfunded liability)		($1,590.2)
Total net experience gains (losses)		($56.6)
Impact of deferral of changes to contribution rates		($9.2)
Impact of change in asset smoothing method		($1,120.7)
Impact of changes in assumptions		
· Discount rate	$271.8	
· Commuted value basis (discount rate)	($174.0)	
· Salary scale	$401.9	
Total impact of changes in assumptions		$499.7
Data and prior service record changes		$32.1
Net impact of other elements of gains and losses		($14.4)
Funding excess (unfunded liability) as at current valuation		($2,259.3)

Plan Experience

The main assumptions are compared with actual experience since the previous valuation:

Plan Experience ($000,000's)	Assumption	Actual 2016	Impact Gain (loss)
Net investment return (actuarial value of assets)	5.25%	4.89%	($125.4)
Increases in pensionable salary	3.20%	3.10%	$42.4
Increases in YMPE	3.00%	0.73%	($69.5)
Interest rate on member contributions	3.00%	1.10%	$12.7
Indexation of pensions in payment	1.20%	0.78%	$62.6
Retirements:			
· number	5,579 rets.	3,247 rets.	$12.0
· average age	62.5 years	62.7 years	
Terminations of employment	7,758 term.	9,498 term.	$34.6
Settlement of inactive member benefits			($16.4)
Pre-retirement mortality	231 deaths	150 deaths	($2.3)
Post-retirement mortality	1,307 deaths	1,391 deaths	($6.3)
Expenses	$38.0 million	$39.0 million	($1.0)
Net experience gains (losses)			($56.6)

Commentary

- The investment return of 4.89% (net of investment management expenses) for 2016 on an actuarial value basis was lower than the valuation assumption of 5.25% per year. This lower investment return produced a loss of approximately $125.4 million. Note that on a market value basis, the rate of return was higher (5.88% for 2016). The smoothing method defers recognition of a portion of gains and losses over a three year period.

- Salaries grew at a lower rate than expected over 2016, resulting in lower actuarial liabilities and therefore an actuarial gain. The YMPE grew by a lower rate than assumed in 2016 resulting in an actuarial loss. Interest credited to member contributions in 2016 was lower than assumed resulting in an actuarial gain. All of these factors contributed to a net increase in the actuarial liabilities (experience loss) of approximately $14.4 million.

- The valuation at December 31, 2015 assumed a cost-of-living increase of 1.20% effective January 1, 2017. The actual cost-of-living increase was 0.78%. The lower than expected cost-of-living increase produced a gain of approximately $62.6 million.

- Mortality, termination and retirement experience in aggregate were more favourable than assumed, producing an experience gain of approximately $21.6 million.

- In the December 31, 2015 valuation, an adjustment to reallocate contributions between service cost and unfunded liability payments was scheduled for January 1, 2018, 2 years after the valuation effective date. While the unfunded liability contributions are adjusted to reflect the deferral of the contribution increases, the current service cost is not. This lag in the timing of the contribution rate adjustment, along with a demographic profile of new entrants different than the average, created a loss of $9.2 million.

- Contributions paid that were in excess of the required current service cost of 17.67% of members' pensionable salary from the December 31, 2015 valuation have resulted in $704.9 million paid towards the unfunded liability.

- In addition, with a plan of this size, it is inevitable that data will change between valuation periods. The combined total of data and prior service record adjustments amounted to $32.1 million loss.

The above commentary outlines the major components of the gain and loss. All other experience items such as timing of events are combined into the "Net impact of other elements of gains and losses" item.

Current Service Cost

The current service cost is an estimate of the present value of the additional expected future benefit cash flows in respect of pensionable service that will accrue after the valuation date, assuming the Plan will be maintained indefinitely.

The current service cost during the year following the valuation date, compared with the corresponding value determined in the previous valuation, is as follows:

($000,000's)	2017	2016
Actuarial present value of benefits to be earned for service in the next 12 months	$1,880.2	$1,792.8
Non-investment related expenses	$39.5	$38.0
Total actuarial normal cost	$1,919.7	$1,830.8
Pensionable Salary[3]	$10,937.5	$10,358.3
Current service cost expressed as a percentage of pensionable salary	17.55%	17.67%

The key factors that have caused a change in the current service since the previous valuation are summarized in the following table:

Current service cost as at previous valuation	17.67%
Demographic changes	0.04%
Changes in assumptions	
· Discount rate	(0.15%)
· Salary scale	(0.23%)
· Commuted value basis (discount rate)	0.21%
· Non-investment related expenses	0.01%
Current service cost as at current valuation	17.55%

Components of Current Service Cost

We have prepared a split of the Plan's current service cost by component so that the Board can have an understanding of the value of the benefits provided under the Plan.

The precise value of each component is sensitive to the order in which they are run, since there is a compounding effect. However, this gives a rough idea of the proportionate values of each component as the compounding effect will not significantly affect the overall picture.

	Component Cost	Proportion of Total Current Service Cost
· Plan pension accrual (1.4%/2.0%), no ancillary benefits	13.76%	78.4%
· Five year guarantee	0.04%	0.2%
· Early retirement (3% from 65)	0.92%	5.3%
· Unreduced pension at 85 points	0.72%	4.1%
· Cost-of-living adjustments (60% of Alberta CPI)	2.11%	12.0%
Total current service cost	17.55%	100.0%

[3] Consistent with prior actuarial funding valuation reports, for the purpose of calculating the current service cost as a percentage of pensionable salary, the pensionable salary has been discounted with interest to the valuation date.

In calculating the current service cost of the Plan components which do not include an unreduced retirement prior to 85 points, it is assumed that retirement experience would be the same as for current plan members who have not achieved 85 points.

Discount Rate Sensitivity

The following table summarizes the effect on the going concern actuarial liability and current service cost shown in this report of using a discount rate which is 1% lower than that used in the valuation. For the purposes of the illustration, we have not changed the interest rate used to determine commuted values upon termination of employment.

Scenario ($000,000's)	**Valuation Basis**	**Reduce Discount Rate by 1%**
Going concern actuarial liability	$38,839.5	$44,949.2
Current service cost		
· Actuarial present value of benefits to be earned for service in the next 12 months	$1,880.2	$2,268.6
· Non-investment related expenses	$39.5	$39.5
Total actuarial normal cost	$1,919.7	$2,308.1

4

Valuation Results – Solvency

Financial Position

In accordance with an amendment to the *Public Sector Pension Plans Act*, the Local Authorities Pension Plan is not subject to the solvency funding requirements outlined in the Alberta *Employment Pension Plans Act*. The Plan is required to disclose the solvency excess or deficiency, but no solvency special payments are required to fund any solvency deficiency that may arise.

When conducting a solvency valuation, we determine the relationship between the respective values of the Plan's assets and its liabilities on a solvency basis, determined in accordance with the Alberta *Employment Pension Plans Act*. The values of the Plan's assets and liabilities on a solvency basis are related to the corresponding values calculated as though the Plan were wound up and settled on the valuation date.

The solvency position as of the valuation date, in comparison with that at the previous valuation date, is as follows:

($000,000's)	**31.12.2016**	**31.12.2015**
Assets		
Market value of assets	$37,722.9	$34,419.6
Present value of prior service payments	$16.5	$10.7
Plan termination expenses	($65.0)	($65.0)
Market value of assets available to provide benefits	$37,674.4	$34,365.3
Present value of accrued benefits for:		
· Active members	$30,080.9	$28,086.9
· Pensioners and survivors	$20,573.2	$19,200.6
· Deferred pensioners and hold-on-deposits	$2,528.7	$2,100.8
Total solvency liability	$53,182.8	$49,388.3
Solvency excess (shortfall)	($15,508.4)	($15,023.0)
Solvency ratio	70.8%	69.6%

Impact of Plan Wind Up

In our opinion, the value of the Plan's assets would be less than its actuarial liabilities if the Plan were to be wound up on the valuation date.

Specifically, actuarial liabilities would exceed the market value of Plan assets available to provide benefits by $15,508.4 million. This calculation includes a provision of $65 million for Plan termination expenses that might be payable from the pension fund if the Plan were wound up.

Solvency Incremental Cost to December 31, 2019

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

The solvency incremental cost determined in this valuation is as follows:

($000,000's)	31.12.2016
Total solvency liabilities at the valuation date (A)	$53,182.8
Present value of projected solvency liability at the next required valuation (including expected new entrants) plus benefit payments (B)	$62,673.8
Solvency incremental cost (B – A) for the 3 year period to the next valuation date	$9,491.0

The incremental cost is not an appropriate measure of the contributions that would be required to maintain the financial position of the plan on a solvency basis unchanged from the valuation date and the next required valuation date, if actual experience is exactly in accordance with the going concern valuation assumptions. This is because it does not reflect the fact that the expected return on plan assets (based on the going concern assumptions) is greater than the discount rate used to determine the solvency liabilities.

Discount Rate Sensitivity

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

Scenario ($000,000's)	Valuation Basis	Reduce Discount Rate by 1%
Total solvency liability	$53,182.8	$62,831.2

5

Funding Requirements

Current service contribution requirements are governed by both the *Public Sector Pension Plans Act*, and the provisions of the *Income Tax Act* and related regulations.

At the time of preparing this valuation report, under the *Public Sector Pension Plans Act*, the total contribution must be no less than (i) the normal actuarial cost, plus (ii) where an unfunded actuarial liability exists, an amount sufficient to amortize the unfunded actuarial liability over no more than 15 years, less (iii) where there is a funding excess, the amount of the funding excess which the Board has authorized as a contribution reduction.

Under the *Income Tax Act*, the total contribution must be no more than (i) the normal actuarial cost, plus (ii) where an unfunded actuarial liability exists, the amount of the unfunded actuarial liability, less (iii) where there is a funding excess, the amount of the funding excess which exceeds a prescribed level.

The following table outlines the range of funding contributions that would be permitted under the *Income Tax Act* and *Public Sector Pension Plans Act* based on the valuation at December 31, 2016:

	Minimum Required Under Public Sector Pension Plans Act for 2019[4]	**Maximum Permitted Under Income Tax Act for 2017**
Current service cost	17.55%	17.55%
Special payments towards unfunded liabilities	1.23%	20.13%[5]
Amortization of funding excess	0.00%	0.00%
Total contribution requirement	18.78%	37.68%

The Board must select a contribution rate for the period until the next actuarial valuation that falls between the minimum and maximum contribution permitted in accordance with the Board's funding strategy. The Board has elected to maintain a contribution rate of 24.16% for the calendar year 2017 and has elected a contribution rate of 22.16% for the calendar year 2018. The contribution rate will remain at 22.16% for the calendar year 2019 subject to the December 31, 2017 valuation. These contribution rates meet the requirements of the *Public Sector Pension Plans Act* and are below the maximum permitted under the *Income Tax Act*. As a result, unless

[4] These are the minimum required funding contributions effective January 1, 2019 assuming that the contribution rate remains at 24.16% of pay for the calendar year 2017 and 22.16% for the calendar year 2018.

[5] Consistent with prior actuarial funding valuation reports, this represents an assumed one-time payment of the December 31, 2016 going-concern unfunded liability.

another actuarial valuation is filed in the future with an earlier application date, the following contribution rates will be in effect for the calendar years 2017 through to 2019[6].

Employee Contributions – As a % of Pensionable Salary

	2017		2018		2019	
	Up to YMPE	**Above YMPE**	**Up to YMPE**	**Above YMPE**	**Up to YMPE**	**Above YMPE**
Current service cost	7.34%	10.48%	7.34%	10.48%	7.34%	10.48%
Unfunded liability	3.05%	4.36%	2.05%	3.36%	2.05%	3.36%
Total contribution	10.39%	14.84%	9.39%	13.84%	9.39%	13.84%
Aggregate	11.58%		10.58%		10.58%	

Employer Contributions – As a % of Pensionable Salary

	2017		2018		2019	
	Up to YMPE	**Above YMPE**	**Up to YMPE**	**Above YMPE**	**Up to YMPE**	**Above YMPE**
Current service cost	8.34%	11.48%	8.34%	11.48%	8.34%	11.48%
Unfunded liability	3.05%	4.36%	2.05%	3.36%	2.05%	3.36%
Total contribution	11.39%	15.84%	10.39%	14.84%	10.39%	14.84%
Aggregate	12.58%		11.58%		11.58%	

[6] The allocations of the current service cost and the unfunded liability on pensionable earnings below and above the YMPE have been updated to reflect the results of the actuarial funding valuation as at December 31, 2016.

Total Contributions – As a % of Pensionable Salary

	2017		2018		2019	
	Up to YMPE	Above YMPE	Up to YMPE	Above YMPE	Up to YMPE	Above YMPE
Current service cost	15.68%	21.96%	15.68%	21.96%	15.68%	21.96%
Unfunded liability	6.10%	8.72%	4.10%	6.72%	4.10%	6.72%
Total contribution	21.78%	30.68%	19.78%	28.68%	19.78%	28.68%
Aggregate	24.16%		22.16%		22.16%	

6

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 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 standards set by the *Public Sector Pension Plans Act.*

ORIGINAL SIGNED BY
Scott Clausen
Fellow of the Canadian Institute of Actuaries
Fellow of the Society of Actuaries

December 12, 2017
Date

ORIGINAL SIGNED BY
Jared Mickall
Fellow of the Canadian Institute of Actuaries
Fellow of the Society of Actuaries

December 12, 2017
Date

APPENDIX A

Prescribed Disclosure

Timing of Next Required Valuation

In accordance with the *Public Sector Pension Plans Act*, an actuarial report must be prepared at intervals not exceeding three years. Accordingly, the next valuation of the Plan will be required as of December 31, 2019.

Special Payments

Going Concern Basis

The following minimum annual special payments must be made to the Plan to eliminate the unfunded liability as at December 31, 2016, in accordance with the *Public Sector Pension Plans Act of Alberta*. The table illustrates the minimum annual special payments in effect from January 1, 2019 onward assuming that total contributions remain at 24.16% of pay for the calendar year 2017 and 22.16% of pay for the calendar year 2018.

Type of Deficit	Valuation Date	Commencement of First Contribution	Percentage of Pensionable Salary[7]	Last Payment	Present Value of Future Payments (millions)
Unfunded Liability	On or prior to Dec. 31, 2010	Jan. 1, 2017	5.86%	Dec. 31, 2017	$639.6
Unfunded Liability	On or prior to Dec. 31, 2010	Jan. 1, 2018	3.59%	Dec. 31, 2018	$379.6
Unfunded Liability	Dec. 31, 2010	Jan. 1, 2018	0.27%	Dec. 31, 2025	$209.9
Unfunded Liability	Dec. 31, 2011	Jan. 1, 2014	0.44%	Dec. 31, 2026	$428.7
Unfunded Liability	Dec. 31, 2013	Jan. 1, 2016	0.31%	Dec. 31, 2028	$354.7
Unfunded Liability	Dec. 31, 2016	Jan. 1, 2019	0.21%	Dec. 31, 2031	$246.8
Total					$2,259.3
Total – 2017			6.61%		
Total – 2018			4.61%		
Total – 2019 - 2025			1.23%		
Total – 2026			0.96%		
Total – 2027 - 2028			0.52%		
Total – 2029 - 2031			0.21%		

[7] The unfunded liability payments are determined based on expected future salary increases.

APPENDIX B

Plan Assets

The pension fund is held in trust by Alberta Investment Management Corporation on behalf of the Local Authorities Pension Plan Board and Alberta Treasury Board and Finance and is invested in accordance with the Board's written statement of investment policies and goals.

We have relied upon the Plan's financial statements prepared by the Auditor General of Alberta without further audit. 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.

Reconciliation of Market Value of Plan Assets

The pension fund transactions since the last valuation are summarized in the following table:

($000,000's)	**2016**
January 1	$34,419.6[8]
PLUS	
Member contributions	$1,227.8
Employer contributions	$1,330.1
Reciprocal transfer in	$9.6
Prior service payments	$35.0
Interest, dividends, accrued income, realized and unrealized gains (losses)	$2,235.9
	$4,838.4
LESS	
Pensions paid	$1,070.8
Termination refunds	$240.3
Fund administrative expenses	$38.8
Investment expenses	$174.2
Reciprocal transfer out	$11.0
	$1,535.1
December 31	$37,722.9[9]
Rate of return net of investment expenses[10]	5.88%
Rate of return net of all expenses[10]	5.77%

[8] Excludes present value of prior service payments of $10.7 million.

[9] Excludes present value of prior service payments of $16.5 million.

[10] Assuming mid-period cash flows.

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.

The Plan's investments are summarized as follows:

Investments	**($000's)**	
· Deposits and Short Term Securities	$470,535	1.2%
· Bonds, Mortgages and Private Debt	$10,580,889	28.1%
Total Fixed Income	$11,051,424	29.3%
· Real Return Bonds	$1,743,228	4.6%
· Infrastructure	$2,320,542	6.2%
· Timberland	$425,824	1.1%
· Real Estate	$4,710,660	12.5%
Total Inflation Sensitive/Alternatives	$9,200,254	24.4%
· Canadian Public Equities	$4,193,071	11.1%
· Global Developed Equities	$9,294,903	24.6%
· Emerging Market Equities	$1,297,110	3.4%
· Private Equities	$1,088,988	2.9%
· Small Cap Equity	$1,270,489	3.4%
Total Equities	$17,144,561	45.4%
Strategic Opportunities and Tactical Allocation	$303,706	0.8%
Accrued Interest, Accounts Receivable and Payable	$22,998	0.1%
Total Market Value of Assets	$37,722,943	100.0%

Investment Policy

The Board has adopted a statement of investment policy and objectives. This policy is intended to provide guidelines for the manager(s) as to the level of risk which is commensurate with the Plan's investment objectives. A significant component of this investment policy is the asset mix.

The Board is responsible for developing a statement of investment policy and goals (SIP&G) to establish the investment principals, policy guidelines and manner in which the assets of the Plan shall be invested and managed. The President of the Alberta Treasury Board and Minister of Finance has a duty to invest the assets in accordance with this SIP&G and applicable legislation. The investment functions of the Minister are performed through Alberta Investment Management Corporation.

The constraints on the asset mix are provided for information purposes:

		Long-term Policy (%)	Policy Range (%)	
Asset Category		**Weighting**	**Min**	**Max**
Fixed Income	Short Term and Cash	0.5	0.0	10.0
	Universe Bonds	15.0	5.0	25.0
	Long Bonds	15.0	5.0	25.0
	Mortgages	0.0	0.0	10.0
	Private Debt and Loan	0.0	0.0	6.0
Total Fixed Income		**30.5**	**20.0**	**40.0**
Inflation Sensitive/Alternatives	Real Return Bonds	0.0	0.0	10.0
	Private Income/Infrastructure	15.0	5.0	25.0
	Timberland	0.0	0.0	3.0
	Real Estate	15.0	10.0	25.0
Inflation Sensitive/Alternatives Total		**30.0**	**20.0**	**50.0**
Short Horizon	Canadian Equity	8.0	5.0	20.0
	Global Developed Equity	15.0	10.0	40.0
	Emerging Market Equity	5.5	0.0	10.0
	Small Cap Equity	5.0	0.0	10.0
Short Horizon Total		**33.5**	**25.0**	**50.0**
Long Horizon	Private Equity	6.0	3.0	9.0
Long Horizon Total		**6.0**	**3.0**	**9.0**
Total Fund (%)		**100.0**		

APPENDIX C

Methods and Assumptions – Going Concern

Valuation of Assets

Under the asset valuation method used in the previous valuation, actual equity returns in excess of fixed income returns are compared to the assumed equity risk premium and any difference is recognized over a three year period. This smoothed value is adjusted for outstanding prior service payments to arrive at the actuarial value of assets. This methodology results in equity returns in excess of fixed income returns above or below the assumed equity risk premium of 3.50% in 2016 (3.70% in 2015) being amortized over a three year period. The smoothed value of the assets at December 31, 2016 under this method is derived as follows:

Market value of assets at 31.12.2016	**$37,722.9**
(Less) Plus 1/3 of excess 2015 equity (gains) losses	$85.4
(Less) Plus 2/3 of excess 2016 equity (gains) losses	($123.9)
Present value of prior service payments	$16.5
Smoothed value of assets at 31.12.2016	**$37,700.9**

For this valuation a new smoothing method was adopted. Under this method, the smoothed value of the Plan assets is the average of:

- the market value of assets as at the valuation date;
- the market value of assets as at December 31, 2015 rolled forward to December 31, 2016;
- the market value of assets as at December 31, 2014 rolled forward to December 31, 2016;
- the market value of assets as at December 31, 2013 rolled forward to December 31, 2016; and
- the market value of assets as at December 31, 2012 rolled forward to December 31, 2016.

The roll forwards of historical market values are based on the actual benefit payments and contributions to the Plan and an assumed rate of return of 6.4% for 2013, 6.7% for 2014, 6.3% for 2015, and 6.0% for 2016. These assumed rates of return are the assumed investment returns, net of expenses, with no margin for adverse deviation associated with the actuarial valuation reports for funding purposes on file for the periods for which the market value of assets is projected.

In order to ensure that the smoothed value does not deviate unduly from the market value, an upper limit of 110% of the market value and a lower limit of 90% of the market value is placed on the smoothed value. The smoothed value for this valuation is not affected by the limits. The asset value produced by this method is related to the market value of the assets, with the advantage that, over time, the market-related asset value will tend to be more stable than the market value.

The smoothed value of assets at December 31, 2016 under this method was derived as follows:

	2012	2013	2014	2015	2016
Market value at 31.12.2012	$22,873.2				
Net cash flow in 2013	$977.6				
Assumed return (6.4%)	$1,495.2				
Expected/market value at 31.12.2013	$25,346.0	$26,560.6			
Net cash flow in 2014	$1,167.6	$1,167.6			
Assumed return (6.7%)	$1,737.3	$1,818.7			
Expected/market value at 31.12.2014	$28,250.9	$29,546.9	$30,799.0		
Net cash flow in 2015	$1,154.9	$1,154.9	$1,154.9		
Assumed return (6.3%)	$1,816.1	$1,897.8	$1,976.7		
Expected/market value at 31.12.2015	$31,221.9	$32,599.6	$33,930.6	$34,430.3	
Net cash flow in 2016	$1,241.6	$1,241.6	$1,241.6	$1,241.6	
Assumed return (6.0%)	$1,894.7	$1,976.7	$2,055.9	$2,085.6	
Expected/market value at 31.12.2016	(A) $34,358.2	(B) $35,817.9	(C) $37,228.1	(D) $37,757.5	(E) $37,739.4
Average of A, B, C, D and E					**$36,580.2**
90% of market value at 31.12.2016					$33,965.5
110% of market value at 31.12.2016					$41,513.4
Smoothed value at 31.12.2016					**$36,580.2**
Impact of asset smoothing					**($1,159.2)**

Going Concern Actuarial Liability

Over time, the real cost of a pension plan is the excess of benefits and expenses over 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, based on projected final average earnings. This is referred to as the actuarial liability. For each individual plan member, accumulated contributions with interest are established as a minimum actuarial liability and each member's current service benefit is tested to ensure that no more than 50% of the value is funded by member contributions. Any member contributions in excess of 50% are included in the actuarial liability.

The *funding excess or unfunded liability*, as the case may be, is the difference between the smoothed value of assets and the actuarial liability. An unfunded liability will be amortised over no more than 15 years through special payments as required under the *Public Sector Pension Plans Act*. A funding excess may, from an actuarial standpoint, be applied immediately to reduce required current service contributions unless precluded by the terms of the Plan or by legislation.

This funding method produces a reasonable matching of contributions with accruing benefits. Because benefits are recognised as they accrue, the actuarial funding method aims at keeping the plan fully funded at all times. This promotes benefit security, once any unfunded liabilities and solvency deficiencies have been funded.

Current Service Cost

The *current service cost* is the actuarial present value of projected benefits to be paid under the plan with respect to service during the year following the valuation date. The current service cost has been expressed as a percentage of the members' pensionable salary to provide an automatic adjustment in the event of fluctuations in membership and / or pensionable salary.

Under the projected unit credit actuarial cost method, the current service cost for an individual member will increase each year as the member approaches retirement. However, the current service cost of the entire group, expressed as a percentage of the members' pensionable salary, can be expected to remain stable as long as the average age of the group remains constant.

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
Nominal discount rate:	5.30% per year	5.25% per year
Non-investment expenses:	$39.5 million	$38 million
Price Inflation:	2.00% per year	2.00% per year
ITA limit / YMPE escalation:	3.00% per year	3.00% per year
Salary escalation:	2.00% per year for 3 years, 3.00% thereafter, plus Age-Based Merit and Promotion Scale	2.75% per year for 3 years, 3.00% thereafter, plus Age-Based Merit and Promotion Scale
Merit and promotion:	Age related table, derived from plan experience	Age related table, derived from plan experience
Post-retirement pension increases:	1.20% per year	1.20% per year
Interest on employee contributions:	3.00% per year	3.00% per year
Retirement rates:	Points (age and service) related table, derived from plan experience from 2003 - 2012	Points (age and service) related table, derived from plan experience from 2003 - 2012
Termination rates:	Age related table, derived from 2003 - 2012 plan experience	Age related table, derived from 2003 - 2012 plan experience
Mortality rates:	Public Sector Canadian Pensioners Mortality Table (CPM2014Publ) with Plan specific adjustments, derived from plan experience from 2003 – 2012	Public Sector Canadian Pensioners Mortality Table (CPM2014Publ) with Plan specific adjustments, derived from plan experience from 2003 – 2012
Mortality improvements:	Fully generational using CPM Improvement Scale B (CPM-B)	Fully generational using CPM Improvement Scale B (CPM-B)
Disability rates:	None	None
Eligible spouse at retirement:	70%	70%
Spousal age difference:	Male 3 years older	Male 3 years older
Percent electing deferred pension:	25%	25%
Commuted value pricing basis:		
· Interest rates:	1.5% per year for the first 10 years and 2.2% per year thereafter	1.6% per year for the first 10 years and 2.6% per year thereafter
· Mortality rates:	Canadian Pensioners Mortality Table (CPM2014)	Canadian Pensioners Mortality Table (CPM2014)
· Mortality improvements:	CPM-B	CPM-B

The assumptions are best-estimate with the exception that the discount rate includes a margin for adverse deviations.

Age and Service Related Tables

Mortality

The following Plan specific multipliers have been applied to the CPM2014Publ table. The multipliers are based on an experience study conducted in 2013, considering actual plan experience over the years 2003 – 2012.

Age Band	Male	Female
<55	100%	100%
55 – 64	80%	70%
65 – 74	120%	90%
75 – 84	110%	95%
85+	100%	100%

Retirement Rates

Retirement rates are summarized below:

Age	Members with less than 85 points	Members with 85 points
55	6.0%	22.2%
56	5.1%	14.7%
57	5.2%	14.9%
58	5.6%	14.9%
59	7.6%	17.5%
60	10.4%	20.9%
61	9.5%	17.1%
62	9.3%	17.8%
63	10.1%	16.6%
64	21.0%	30.2%
65	50.0%	50.0%
66	50.0%	50.0%
67	50.0%	50.0%
68	50.0%	50.0%
69	100.0%	100.0%

Termination Rates

Sample rates are summarized below:

	Males			Females		
Age	**0 – 1 Years of Service**	**1 – 2 Years of Service**	**Ultimate**	**0 – 1 Years of Service**	**1 – 2 Years of Service**	**Ultimate**
20	27.30%	15.00%	8.90%	31.50%	24.20%	10.00%
21	21.00%	13.70%	8.90%	20.30%	22.50%	10.00%
22	18.90%	13.80%	8.90%	18.40%	17.50%	10.00%
23	15.90%	12.60%	8.90%	18.50%	13.30%	10.00%
24	17.20%	11.40%	8.90%	16.10%	13.00%	10.00%
25	15.80%	9.50%	8.90%	15.80%	12.90%	10.00%
26	14.10%	11.80%	7.50%	15.40%	12.50%	9.60%
27	14.50%	11.70%	7.30%	16.20%	12.50%	9.20%
28	13.80%	10.00%	6.90%	16.00%	13.50%	9.70%
29	12.80%	11.10%	6.70%	16.00%	11.90%	8.90%
30	12.40%	10.20%	6.50%	14.90%	12.80%	9.50%
31	11.20%	10.00%	5.60%	16.40%	11.70%	8.70%
32	12.90%	9.30%	5.60%	14.60%	12.70%	8.90%
33	13.20%	9.00%	5.50%	14.60%	12.20%	8.00%
34	11.40%	7.40%	5.50%	14.00%	11.90%	7.80%
35	14.80%	8.50%	4.90%	13.30%	10.20%	7.70%
36	13.00%	10.70%	5.50%	14.50%	10.50%	6.70%
37	10.40%	8.20%	4.30%	13.90%	11.20%	6.60%
38	12.20%	8.80%	4.90%	12.70%	9.00%	6.20%
39	10.70%	9.00%	4.60%	12.60%	9.00%	5.70%
40	11.80%	8.20%	4.00%	12.50%	9.50%	4.80%
41	10.50%	6.80%	3.70%	11.50%	8.00%	4.90%
42	13.00%	9.20%	3.70%	11.30%	9.00%	4.70%
43	13.60%	10.20%	3.40%	11.20%	8.90%	4.70%
44	11.30%	7.50%	3.00%	11.40%	7.30%	4.30%
45	11.30%	6.40%	3.50%	10.00%	7.40%	4.00%
46	11.80%	8.90%	3.10%	10.60%	8.00%	3.90%
47	10.10%	7.50%	2.90%	10.00%	7.80%	4.00%
48	9.70%	8.00%	2.90%	11.10%	7.70%	3.80%
49	11.40%	6.20%	2.60%	11.30%	7.40%	3.80%
50	13.00%	6.10%	2.80%	11.70%	7.60%	4.10%
51	9.20%	7.20%	2.80%	11.10%	8.40%	4.00%
52	13.00%	9.50%	2.90%	10.50%	8.30%	3.80%
53	8.90%	7.20%	3.00%	11.90%	7.40%	3.60%
54	13.10%	6.80%	6.30%	10.50%	8.20%	5.20%
55	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Pensionable Earnings

The benefits ultimately paid will depend on each member's final average salary. To calculate the pension benefits payable upon retirement, death or termination of employment, we have taken pensionable earnings for the 2016 calendar year and assumed that such pensionable earnings will increase at the assumed rate.

Sample merit and promotion rates are summarized below:

Age	Merit and Promotion Sample Rates
20	3.00%
25	2.50%
30	1.60%
35	1.25%
40	0.90%
45	0.70%
50	0.40%
55	0.15%
60	0.00%

Other Methodologies

We have prepared a list of additional assumptions and methods used in the valuation of the Plan. This list is intended to assist users of this report in understanding the specific benefits valued. Small differences in methods and assumptions in a plan of this size can sometimes have effects in the millions of dollars. Other sections of the report have dealt with data omissions so they will not be repeated here.

- It is assumed that indexation of deferred and immediate pensions commences 1 year after termination or retirement;
- Spousal benefits payable on a member's death are based on the member's base pension if the member retired after December 31, 2003, and are based on the member's coordinated pension for all others;
- Current service contributions are based on pensionable salary, not unlimited salary;
- The pensionable salary for calculating the normal cost percentage is nil for employees over age 69 and nil for employees with more than 35 years of service; and
- For deferred benefits on termination or death, the pensions were deferred to age 55 with the early reduction factor calculated from the earlier of age 65 and the attainment of 85 points.

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 fund assets net of investment fees and less a margin for adverse deviations. 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 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. Such fees were determined by the difference between the provision for total investment expenses and the hypothetical fees that would be incurred for passive management of all assets.
- Implicit provision for investment expenses determined based on historical expenses paid from the fund; and
- A margin for adverse deviations of 1.00%.

The discount rate was developed as follows:

Assumed investment return, net of median fees for non-public market asset classes	6.33%
Additional returns for active management	0.44%
Investment expense provision for public market asset classes	(0.47%)
Margin for adverse deviation	(1.00%)
Net discount rate	5.30%

The Board recognizes that a portion of this future return is expected to come from equity risk premiums (equity returns above bond yields), and has considered the expected additional risk and volatility when setting the discount rate. If the fund achieves higher investment returns than assumed, gains will be revealed at subsequent valuations. If the fund achieves lower investment returns, losses will emerge.

Expenses

A provision for administrative expenses is reflected in the current service cost and is based on actual administrative expenses for 2016. A provision for investment management expenses is reflected in the discount rate.

Inflation

The level of price inflation directly influences benefits provided by the Plan by the application of the cost-of-living increases. It is also useful in developing a coherent set of economic assumptions by relating several of the individual assumptions to an assumed long term level of underlying price inflation.

The inflation assumption is based on the Board's expectations of long term inflation at the valuation date of 2.00%. No differentiation is made between expected inflation for Alberta versus Canada.

Income Tax Act Pension Limit and Year's Maximum Pensionable Earnings

The assumption is based on historical real economic growth, Canada Pension Plan economic assumptions, and the underlying inflation assumption.

To the extent that the YMPE increases by greater than the assumed rate, gains will accrue in the Plan's funding. Losses will emerge if the YMPE increases at a lower rate than assumed.

Pensionable Salary

The assumption is based on general wage growth assumptions increased by our best estimate of future merit and promotional increases. This assumption also reflects input received from the Board with respect to expectations in general wage growth over the first three years following the valuation date.

The merit and promotion scale was derived from the experience of the Local Authorities Pension Plan for years 1989 to 1993. An experience study that was conducted in 2013 considering increases over the years 2003 to 2012 suggested this assumption is still appropriate.

To the extent that salaries increase by greater than assumed rates, losses will accrue in the plan's funding. Gains will emerge if salaries increase at a lower rate than assumed.

Cost-of-Living Increases

The assumption is based on the Plan formula and inflation assumption above.

Retirement Rates

Age at retirement is an important consideration for this plan because of the plan design that encourages early retirement. The younger members are at retirement, the greater the cost to the plan of a given member's pension.

The assumption is based on Plan experience over the years 2003 to 2012. Subsequent experience will be reviewed for consistency with these rates.

Termination Rates

We have made an allowance for projected benefits payable on the termination of employment before retirement for reasons other than death.

The assumption is based on Plan experience over the years 2003 to 2012. Subsequent experience will be reviewed for consistency with these rates.

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 2003 to 2012. Subsequent experience will be reviewed for consistency with these rates.

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. The Canadian Pensioners Mortality (CPM) study published by the Canadian Institute of Actuaries in February 2014 included CPM Improvement Scale B (CPM-B). For the present valuation, we have continued to use the CPM-B scale without adjustment, which is a reasonable outlook for future mortality improvement.

A report released by the Canadian Institute of Actuaries Task Force on Mortality Improvement (Task Force) in draft form in April 2017 and in final form 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. In particular, MI-2017 includes different historical improvement rates compared to CPM-B and reflects higher long-term mortality improvement rate assumptions than CPM-B. MI-2017 would generally result in higher life expectancies than CPM-B. We will review the mortality improvement scale in the next valuation.

Based on the assumption used, the life expectancy of a member age 65 at the valuation date is 22.2 years for males and 24.9 years for females.

Interest on Employee Contributions

The assumption is based on Plan terms and the underlying investment return assumption.

Disability Rates

Based on the number of employees in approved LTD plans and the small number of disability claims experienced by the plan, we believe it is appropriate to ignore the contingency of disability as being material.

Eligible Spouse

The assumption is based on Plan experience over the years 2003 to 2012.

Spousal Age Difference

The assumption is based on Plan experience over the years 2003 to 2012.

Percent Electing Deferred Pension / Liabilities for CV Payouts

The assumption is based on historical Plan termination experience and the current CIA commuted value basis, adjusted to reflect the mortality basis applicable under current actuarial standards.

APPENDIX D

Methods and Assumptions – Solvency

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.

To determine the actuarial liability on a hypothetical wind-up or solvency 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.

There are no benefits under the plan contingent upon the circumstances of the plan wind-up or contingent upon other factors. In particular, there are no additional benefits that would be immediately payable if the operations of each participating employer were discontinued on the valuation date. Therefore, it was not necessary to postulate a scenario upon which the hypothetical wind-up valuation is made. Therefore, no benefits payable on plan wind-up were excluded from our calculations.

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, 2016.

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.

However, there is limited data available to provide credible guidance on the cost of a purchase of indexed annuities in Canada. In accordance with the *Canadian Institute of Actuaries Educational Note: Assumptions for Hypothetical Wind-up and Solvency Valuations with Effective Dates Between December 31, 2016 and December 30, 2017 (the "Educational Note")*, we have assumed that an appropriate proxy for estimating the cost of such purchase is using the yield on the long-term Government of Canada Real Return bonds, reduced by 0.60%.

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 no adjustment to the mortality rates used in the regular annuity purchase assumptions is required.

We have not included a margin for adverse deviation in the solvency valuation.

The assumptions are as follows:

Form of Benefit Settlement Elected by Member	
Lump sum	100% of active and deferred members under age 55 elect to receive their benefit entitlement in a lump sum
Annuity purchase	All remaining members are assumed to elect to receive their benefit entitlement in the form of a deferred or immediate pension. These benefits are assumed to be settled through the purchase of deferred or immediate annuities from a life insurance company.
Basis for Benefits Assumed to be Settled through a Lump Sum	
Mortality rates:	CPM2014 with projection for future mortality improvements on a generational basis (CPM-B)
Interest rate (net of cost of living increases):	1.50% per year for 10 years, 2.20% per year thereafter
Basis for Benefits Assumed to be Settled through the Purchase of an Annuity	
Mortality rates:	CPM2014 with projection for future mortality improvements on a generational basis (CPM-B)
Adjustment to mortality rates:	No adjustment
Interest rate (net of cost of living increases):	1.20% per year
Retirement Age	
Maximum value:	Members are assumed to retire at the age which maximizes the value of their entitlement from the Plan, based on the eligibility requirements which have been met at the valuation date
Other Assumptions	
Final average earnings:	Based on actual pensionable earnings over the averaging period
Family composition:	Same as for going-concern valuation
Maximum pensionable salary limit:	$162,312
Termination expenses:	$65 million

To determine the solvency 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 sponsors 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.

The solvency position is determined in accordance with the requirements of the *Employment Pension Plans Act* of Alberta.

Incremental Cost

In order to determine the incremental cost, we estimate the solvency liabilities at the next valuation date. We have assumed that the cost of settling benefits by way of a lump sum or purchasing annuities remains consistent with the assumptions described above. Since the projected solvency liabilities will depend on the membership in the Plan at the next valuation date, we must make assumptions about how the Plan membership will evolve over the period until the next valuation.

We have assumed that the Plan membership will evolve in a manner consistent with the going concern assumptions as follows:

- Members terminate, retire, and die consistent with the termination, retirement, and mortality rates used for the going concern valuation.
- Pensionable earnings, the Income Tax Act pension limit, and the Year's Maximum Pensionable Earnings increase in accordance with the related going concern assumptions.
- Active members accrue pensionable service in accordance with the terms of the Plan.
- To accommodate for new entrants to the Plan, we have added to the projected liability an amount equal to the liability of new entrants that have joined the Plan over the past three years. The demographics and earnings of the new entrants are consistent with the new entrants hired over the past three years.

APPENDIX E

Membership Data

Analysis of Membership Data

The actuarial valuation is based on membership data as at December 31, 2016 provided by Alberta Pensions Services Corporation (APS). This data included dates of birth, gender, full / part-time status, pensionable current service, prior bought service, prior service being bought and reciprocal service. Service fields were split for pre-1992 and post-1991 service. Pensionable salary and in-year service were also provided. Contribution information was also provided, split by employee / employer and pre-1992 / post-1991 service.

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 the membership reconciliation, basic information (date of birth, date of hire, date of membership, gender, etc.), pensionable salary, credited service, contributions accumulated with interest and pensions to retirees and other members entitled to a deferred pension. Contributions, lump sum payments and pensions to retirees were compared with corresponding amounts reported in the Plan's financial statements.

Despite these numerous tests, where data was still unreliable or unavailable, assumptions were required to complete the data. These assumptions are summarised below:

Description	Assumption
Annualization of pensionable salary	Data provided by APS included actual salary and service in 2016. For those members with small service (less than 0.1 years in 2016), annualized salary was set to last year's annualized salary increased by 2.75% plus merit and promotion. For those with small service and no prior salary information, annualized salary was set to $76,959.
Missing salary	For those members missing salary information in 2016, annualized salary was set to last year's annualized salary increased by 2.75% plus merit and promotion. For members with no prior salary information, annualized salary was set to $76,959.
Missing service	For those members missing all service information in the data, service was set to last year's plus the service ratio set out last year.
Service ratios for part-timers	Service ratios are now provided by APS. For those members missing service ratio information, service ratios were set equal to 2016 in-year service, subject to a minimum of 0.4, for all members who were active as at January 1, 2016. Service ratios were set to a minimum of 90% for new entrants.
2017 pensionable salary	We have assumed that the 2017 pensionable salary to be used as a divisor for the normal cost percentage will equal the expected pay at the middle of 2017 (2016 pay increased by 2.00% plus merit and promotion plus ½ year interest at 5.30% per year).

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.

	31.12.2016	31.12.2015
Active Members		
· Number	157,319	155,976
· Expected average annualized pay for following year	$78,285	$76,959
· Average years of pensionable service	8.9 years	8.7 years
· Average age	45.4 years	45.2 years
· Average employee contributions	$54,568	$50,359
Deferred Pensioners		
· Number	22,206	20,015
· Average annual deferred pension at normal retirement, with COLA to January 1 of following year	$6,756	$6,477
· Average age	48.0 years	47.9 years
Hold-on-Deposits		
· Number	12,196	9,991
· Average contributions with interest	$3,656	$3,294
· Average age	46.4 years	47.7 years
Pensioners and Survivors		
· Number	61,891	58,913
· Average annual pension at January 1 of following year	$17,420	$16,890
· Average age	71.4 years	71.1 years

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

Actives		
Actives @ 31.12.2015		155,976
Adjustments		(146)
Plus:	New & transfers in	13,434
	Transfers from inactive	950
Less:	Retirements & disabilities	(3,247)
	Terminations - deferreds & hold-on deposits	(7,112)
	Terminations - paid out and transfers out	(2,386)
	Deaths	(150)
Actives @ 31.12.2016		157,319
Deferreds & Hold-on Deposits		
Deferreds & hold-on deposits @ 31.12.2015		30,006
Adjustments		39
Plus:	Transfers from actives	7,112
Less:	Retirements	(631)
	Deaths	(31)
	Paid out and transfers out	(1,143)
	Transfers to actives	(950)
Deferreds and hold-on deposits @ 31.12.2016		34,402
Pensioners and Survivors		
Pensioners and survivors @ 31.12.2015		58,913
Adjustments		6
Plus:	New pensioners from active	3,247
	New pensioners from deferred and hold-on-deposits	631
	New beneficiaries	485
Less:	Deaths or expiry of guarantee	(1,391)
	Return to active and deferred	0
Pensioners and survivors @ 31.12.2016		61,891

The distribution of the active members by age and pensionable service as at the valuation date is summarized as follows:

	Years of Pensionable Service								
Age	**0 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25 - 29**	**30 - 34**	**35+**	**Total**
Under 20	50								50
	49,328								49,328
20 - 24	2,937	18							2,955
	62,889	68,055							62,920
25 - 29	11,613	1,522	5						13,140
	72,471	79,372	66,680						73,268
30 - 34	11,900	6,709	594	2					19,205
	75,550	87,447	92,379	*					80,228
35 - 39	9,523	7,169	2,576	275	1				19,544
	71,844	87,977	95,810	98,044	*				81,290
40 - 44	8,454	6,640	3,562	1,367	82	2			20,107
	68,936	83,474	95,156	98,843	94,072	*			80,520
45 - 49	6,977	6,285	3,990	2,388	871	391	8		20,910
	68,386	77,593	87,920	95,668	98,810	95,391	112,097		79,786
50 - 54	5,663	6,154	4,394	3,015	1,806	1,818	643	64	23,557
	67,572	72,974	79,985	86,733	94,757	97,191	91,352	85,979	78,820
55 - 59	3,896	4,975	3,961	3,079	1,777	1,937	1,220	613	21,458
	70,082	71,060	74,889	78,446	86,251	91,477	93,498	88,642	77,528
60 - 64	1,841	2,762	2,408	2,249	1,299	1,203	786	594	13,142
	68,228	70,110	72,703	76,642	80,135	83,875	84,952	86,793	75,332
Over 65	409	699	602	504	261	315	206	255	3,251
	66,940	68,804	70,260	72,717	73,021	79,057	81,981	86,874	73,030
Total	63,263	42,933	22,092	12,879	6,097	5,666	2,863	1,526	157,319
	70,825	79,792	84,067	85,626	88,802	91,278	89,893	87,515	78,285

* Certain cells have been suppressed in order to preserve confidentiality.

The distribution of the pensioners and survivors by age as at the valuation date is summarized as follows:

	Pensioners and Survivors	
Age	**Number**	**Average Annual Pension**
Under 50	131	$9,249
50 – 54	152	$11,531
55 – 59	3,614	$25,512
60 – 64	10,468	$23,923
65 – 69	16,266	$18,834
70 – 74	12,610	$15,572
75 – 79	8,285	$13,006
80 – 84	5,518	$11,920
85 – 89	3,323	$11,904
90 – 94	1,216	$11,165
95 and above	308	$10,268
Total	61,891	$17,420

APPENDIX F

Summary of Plan Provisions

This valuation is based on the plan provisions in effect on December 31, 2016. This summary is not intended as a complete description of the Plan.

Eligibility for Membership	Eligible participants include full-time and part-time employees who meet criteria specified in the Plan.
Pensionable Service	As defined under the provisions of the Plan, shall not exceed 35 years.
Credited Interest	The rate of interest credited to members' contributions is the average yield of five year personal fixed term chartered bank deposits (CANSIM series V122515) over the most recent 12 month period.
Retirement Dates	*Normal Retirement Date* The normal retirement age is 65. *Early Retirement Date* If a member has been in the Plan for at least two years, the member may choose to retire as early as age 55.
Normal Retirement Pension	2.0% of pensionable salary, multiplied by years of pensionable service prior to January 1, 1966, PLUS 1.4% of pensionable salary up to the average YMPE, multiplied by pensionable service after December 31, 1965, PLUS 2.0% of pensionable salary in excess of the average YMPE, multiplied by pensionable service after December 31, 1965.
Pensionable Salary	Pensionable salary is the member's average annual salary in the five consecutive years of pensionable service in which such average is the highest. Average YMPE is the average of the Year's Maximum Pensionable Earnings over the same period used to determine the highest average pensionable salary. Pensionable salary in 2017 for service on and after January 1, 1992 will be limited to $145,722 plus 30% of the YMPE in 2017. After 2017, this maximum pensionable salary is expected to increase with average industrial wage base increases.
Early Retirement Pension	Members retiring early are entitled to a reduced normal retirement pension commencing immediately. If the member has accrued 85 points (i.e., age plus pensionable service totals at least 85), no reduction is applied. If the member has not accrued 85 points, the normal retirement pension is reduced by 3% for each year that the member's early retirement age precedes the earlier of age 65 and the age at which 85 points would be reached (based on pensionable service accrued to the member's date of termination).

Death Benefits

Pre-retirement:

If a member dies before retirement, benefits payable from the plan will depend on the member's length of plan membership, as follows:

Death Before Retirement

Pre-1992 Service	Benefit
No Spouse	
· < 2 years of pensionable service	Refund of 1 x member contributions
· > 2 years of pensionable service	100% of commuted value plus excess contributions
Spouse	
· < 2 years of pensionable service	Refund of 1 x member contributions
· > 2 years of pensionable service	Either 100% of commuted value or pension for life determined as though the member had retired on the day before death and elected a J&S 100% optional form pension, plus excess contributions.

Post-1991 Service	Benefit
No Spouse	
· < 2 years of pensionable service	Refund of 1 x member contributions
· > 2 years of pensionable service	100% of commuted value plus excess contributions
Spouse	
· < 2 years of pensionable service	Refund of 1 x member contributions
· > 2 years of pensionable service	Either 100% of commuted value or pension for life determined as though the member had retired on the day before death and elected a J&S 100% optional form pension, plus excess contributions.

Post retirement:

The normal form of pension is a pension guaranteed for five years. If the member dies before 60 monthly payments are made, the balance of the 60 payments are payable to the member's spouse or beneficiary. Optional forms of pension are available on an actuarially equivalent basis.

Termination Benefits

If a member's employment terminates for reasons other than death or retirement, the benefits payable from the plan will depend on the member's length of plan membership, as follows:

Benefits in the Event of Termination of Employment

If member has:	The plan will pay:
Less than two years of pensionable service	· Refund of member contributions
At least two years of pensionable service	· Deferred pension (deferred to the earlier of age 65 or attainment of 85 points, based on pensionable service to date of termination). · For all service, excess contributions, if any, will be paid. · For all service, in lieu of the deferred pension, the pension may elect to transfer out 100% of the commuted value plus excess contributions. · Reciprocal transfers are available for both pre-1992 and post-1991 service.

Disability Benefits

If the member is not receiving benefits from an LTD plan and the member is permanently and totally disabled, the member is entitled to an immediate unreduced pension based on pensionable service and salary to the date of disability. If the member is partially disabled, the pension is reduced in the same manner as an early retirement pension.

If the member is receiving benefits from an LTD plan, participation in this plan depends on whether or not the LTD plan is an approved plan. If the LTD plan is an approved plan, participation in this plan continues, but no pension is payable concurrently with the LTD benefit. For the purpose of determining contributions and benefits, pensionable salary will be the pensionable salary immediately preceding disability, increased by subsequent general wage increases applicable for that member's class.

If the LTD plan is not approved, the member is considered to be on a disability leave. The member is eligible to "buy back" this period of leave, as outlined in the plan, upon return to active employment.

Cost-of-Living Increases

Cost-of-living increases based on 60% of the Alberta CPI apply to both deferred pensions and pensions in payment, both before and after retirement.

APPENDIX G

Alberta Pensions Services Corporation Certification

With respect to the report on the actuarial valuation of the *Local Authorities Pension Plan*, as at December 31, 2016, on behalf of Alberta Pensions Services Corporation, I hereby certify that, to the best of my knowledge and belief:

- A copy of the official plan documents and of all amendments made up to December 31, 2016 was provided to the actuary and is reflected appropriately in the summary of plan provisions contained herein.

- The membership data provided to the actuary included a description that is reasonably free of material misstatement of every person who is entitled to benefits under the terms of the Plan for service up to December 31, 2016.

- All events subsequent to December 31, 2016 that may have an impact on the Plan have been communicated to the actuary.

ALBERTA PENSIONS SERVICES CORPORATION

December 12, 2017	ORIGINAL SIGNED BY
Date	Signed
	Doug Woloshyn
	Name

APPENDIX H

Local Authorities Pension Plan Certification

With respect to the Report on the Actuarial Valuation for Funding Purposes as at December 31, 2016 of the *Local Authorities Pension Plan*, I hereby certify that, to the best of my knowledge and belief:

- The valuation reflects the terms of the Board of Trustees' engagement with the actuary described in Section 2 of this report, particularly the requirement to include a margin of 1.00% in the discount rate used to perform the going concern valuation.

- The asset information summarized in Appendix B is reflective of the Plan's assets.

- All events subsequent to December 31, 2016 that may have a material impact on the Plan have been communicated to the actuary.

ALBERTA LOCAL AUTHORITIES PENSION PLAN CORP.

December 11, 2017	ORIGINAL SIGNED BY
Date	Signed
	Christopher A. Brown
	Name

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Mercer (Canada) Limited
222 - 3rd Avenue SW, Suite 1200
Calgary, Alberta T2P 0B4
+1 403 269 4945