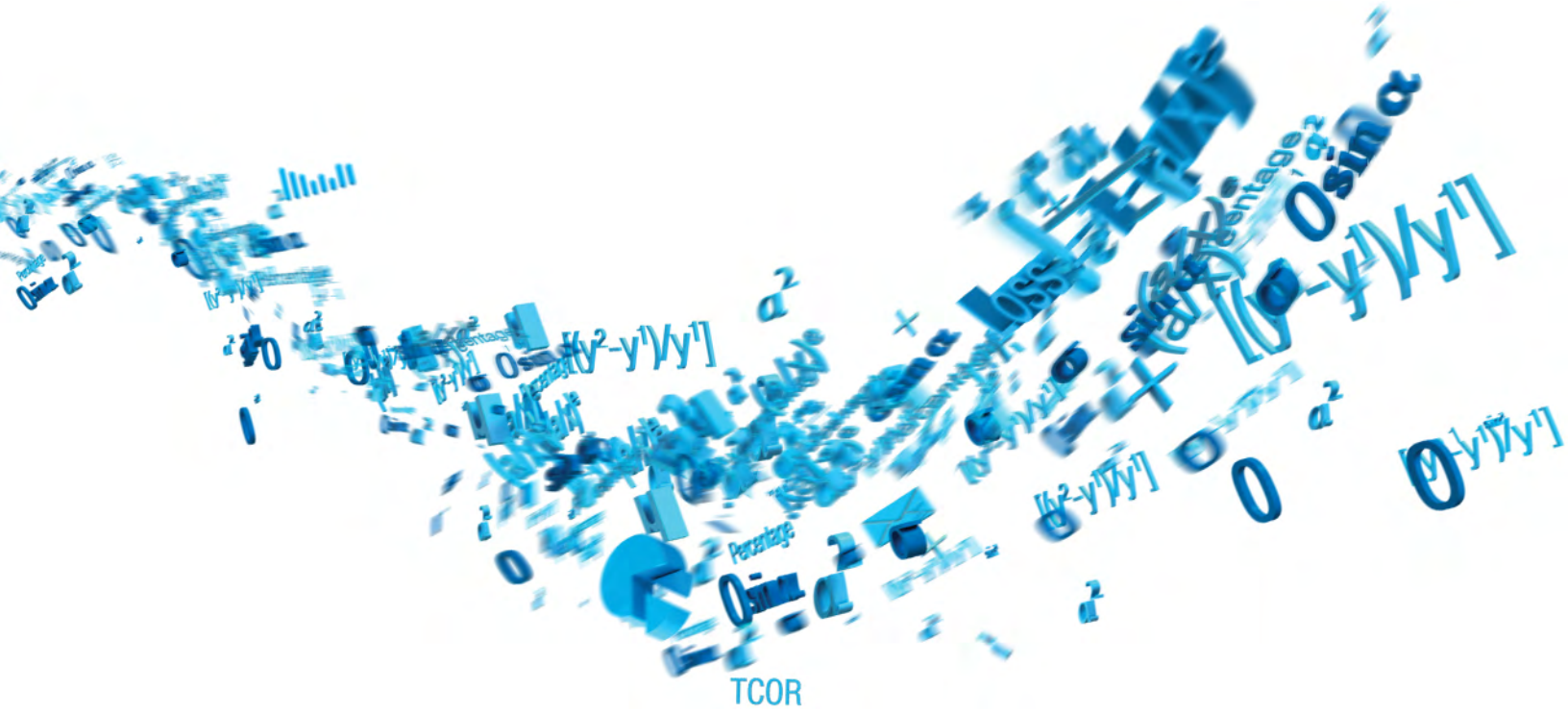

Actuarial Valuation as at December 31, 2016 for Universities Academic Pension Plan

Regulatory Registration Number: 0339572

December 27, 2017

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Executive Summary

An actuarial valuation has been prepared for the Universities Academic Pension Plan (the "Plan") as at December 31, 2016 for the primary purpose of establishing a funding range in accordance with legislative requirements for the Plan until the next actuarial valuation is performed. This section provides an overview of the important results and the key valuation assumptions which have had a bearing on these results. The next actuarial valuation for the purposes of developing funding requirements should be performed no later than as at December 31, 2019.

Summary of Principal Results[1]

Financial Position (000's)

December 31, 2016	**Going Concern**	**Solvency**
Assets	$ 4,300,100	$ 4,346,400
Liabilities	$ 5,403,400	$ 8,068,300
Excess/(Deficit)	**$ (1,103,300)**	**$ (3,721,900)**

December 31, 2014	**Going Concern**	**Solvency**
Assets	$ 3,564,800	$ 3,764,900
Liabilities	$ 4,773,800	$ 7,418,500
Excess/(Deficit)	**$ (1,209,000)**	**$ (3,653,600)**

Legislative Ratios

	December 31, 2016	**December 31, 2014**
Funded ratio	0.7958	0.7467
Solvency ratio	0.5387	0.5075

[1] Net of all adjustments such as estimated wind up expenses, where applicable.

Contribution Requirements

Considering the funding status of the Plan, the member and employer contributions with effect from July 1, 2018, and those recommended at December 31, 2014 and effective July 1, 2016, both of which are within the range of minimum and maximum contribution amounts as outlined in Section 4 and in accordance with legislative requirements are as follows:

(000's)	**December 31, 2016**	**December 31, 2014**
Estimated normal cost	$ 198,200	$ 169,400
As a % of capped earnings	21.52%	20.03%
Pre-1992 unfunded liability payments as a percentage of total earnings (excluding government share)	2.90%	3.54%
Post-1991 unfunded liability payments as a percentage of capped earnings	4.44%	4.93%
Minimum annual member and employer contribution effective July 1, 2018 (2016)	28.86% of pensionable earnings[1]	28.50% of pensionable earnings[1]
Maximum member and employer contribution until the next valuation	21.52% of capped earnings plus $3,721,900	20.03% of capped earnings plus $3,653,600
Implemented contribution rate effective July 1, 2018 (2016) as a percentage of pensionable earnings[1] (excluding government share)	28.86%	28.50%
Government share of pre-1992 unfunded liability contributions as a percentage of total earnings	1.25%	1.25%

[1] Total earnings used for Pre-1992 unfunded liability contributions and capped earnings used for other contributions

Key Assumptions

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

Going Concern	**December 31, 2016**	**December 31, 2014**
Discount rate	5.60% per annum	5.95% per annum
Inflation rate	2.25% per annum	Same
Pensionable earnings – Base	1.50% plus merit and promotion scale for 2 years, 2.75% plus merit and promotion scale thereafter	1.0% plus merit and promotion scale for 2 years, 2.75% plus merit and promotion scale thereafter
Maximum Pension Increase	2.75% per annum	Same
Mortality table	85% (100% for females) of 2014 Canadian Pensioner Mortality Table (“CPM2014Publ85%”) with generational improvements using CPM Scale B2D (“CPM-B”)	Same
Retirement rates	Rates based on 2009 to 2014 experience	Same
Termination rates	Rates based on 2009 to 2014 experience	Same
Merit and promotion salary scale	Rates based on 2009 to 2014 member earnings	Same
Total payroll growth	2.75% per annum for 2 years and 4.0% per annum thereafter	2.25% per annum for 2 years and 4.0% per annum thereafter
Solvency	**December 31, 2016**	**December 31, 2014**
Discount rate	Annuity purchases: 1.2% per annum; net of indexing Transfers: 1.5% per annum for 10 years, 2.2% per annum thereafter; net of indexing	Annuity purchases: 0.7% per annum; net of indexing Transfers: 1.8% per annum for 10 years, 2.5% per annum thereafter; net of indexing
Mortality table		
- Annuity purchase basis	100% of 2014 Canadian Pensioner Mortality Table (“CPM2014”) with generational improvements using CPM Scale B2D (“CPM-B”)	100% of 1994 Uninsured Pensioner (“UP94”) Mortality Table with generational improvements using Scale AA
- Transfer value basis	85% (100% for females) of 2014 Canadian Pensioner Mortality Table (“CPM2014Publ85%”) with generational improvements using CPM Scale B2D (“CPM-B”)	92% of 1994 Uninsured Pensioner (“UP94”) Mortality Table with generational improvements using Scale BB
Retirement rates	100% immediate retirement if at least age 55; otherwise 100% at age 55	Same
Termination rates	100% on valuation date	Same

Section 1: Introduction

Purpose and Terms of Engagement

We have been engaged by Universities Academic Pension Plan Board of Trustees, and hereafter referred to as the "Board", to conduct an actuarial valuation of the Plan, registered in Alberta, as at December 31, 2016 for the general purpose of determining the minimum and maximum funding contributions required by pension standards, based on the actuarial assumptions and methods summarized herein. More specifically, the purposes of the valuation are to:

- Determine the financial position of the Plan on a going concern basis as at December 31, 2016;
- Determine the financial position of the Plan as at December 31, 2016 on a solvency basis;
- Determine the funding requirements of the Plan as at December 31, 2016; and
- Provide the necessary actuarial certification required under the *Employment Pension Plans Act (EPPA)* and the *Income Tax Act (ITA).*

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

In accordance with the Sponsorship and Trust Agreement for the Plan, an actuarial valuation report must be filed at least once every three years; therefore, the next required valuation will be as at December 31, 2019, or earlier.

As directed by the Board, this report will be filed with Alberta Treasury Board and Finance and Canada Revenue Agency.

Summary of Changes Since the Last Valuation

The last such actuarial valuation in respect of the Plan was performed as at December 31, 2014. Since the time of the last valuation, we note that the following events have occurred:

- The Canadian Institute of Actuaries made revisions to the guidance for assumptions for hypothetical wind up and solvency valuations effective September 30, 2015. The key change to the guidance was the change in mortality from the 1994 Uninsured Pensioner (UP94) Mortality Table with generational improvements using Scale AA to the 2014 Canadian Pensioners' Mortality Table combined with mortality improvement scale CPM-B.
- Solvency assumptions have been revised due to general fluctuations in bond rates over the past two years and the CIA guidance revision described above. The changes affecting solvency liabilities are summarized on page 5 of this report.
- Going concern actuarial assumptions have been revised. The changes are summarized on page 5 and the financial impact of these changes is summarized on pages 12 to 14 of this report.
- The Statement of Investment Policies and Goals was revised and approved by the Board with an effective date of January 1, 2017. The revised Statement of Investment Policies and Goals is reflected in appendix B of this report and in the determination of the going concern discount rate.

Board Information and Inputs

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

- A copy of the previous valuation report as at December 31, 2014;
- Membership data compiled as at December 31, 2016 by Conduent HR Services, and staff of the Board as summarized in Appendix C;
- Asset data taken from the Plan's audited financial statements as summarized in Appendix B; and
- A copy of the latest plan text and amendments up to and including December 31, 2016.

Furthermore, our actuarial assumptions and methods have been chosen to reflect our understanding of the Board's desired funding objectives with due respect to accepted actuarial practice and regulatory constraints.

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, 2016 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: Going Concern Valuation Results

Going Concern Financial Position of the Plan

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

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

On the basis of the Plan provisions, membership data, going concern assumptions and methods, and asset information described in the Appendices, the going concern financial position of the Plan as at December 31, 2016 is shown in the following table. The results as at December 31, 2014 are also shown for comparison purposes.

Going Concern Financial Position (000's)

	December 31, 2016	December 31, 2014
Actuarial Value of Assets		
Market value	4,349,300	3,767,600
Smoothing adjustment	(49,200)	(202,800)
Total Actuarial Value of Assets	**$ 4,300,100**	**$ 3,564,800**
Going Concern Liabilities		
Active and suspended members	$ 2,387,200	$ 2,008,100
Deferred vested members	207,100	178,500
Amounts held on deposit	2,800	2,900
Retired members and beneficiaries	2,806,300	2,584,300
Total Liabilities	**$ 5,403,400**	**$ 4,773,800**
Actuarial Excess/(Unfunded Liability)	**$ (1,103,300)**	**$ (1,209,000)**
Going Concern Funded Ratio	0.7958	0.7467

Since an agreement is in place whereby a portion of the pre-1992 unfunded liabilities are funded by the Government of Alberta, it is necessary to track the financial status of the benefits in respect of service pre and post January 1, 1992. The following table summarizes this split:

Financial Position – Going Concern Basis (000's)

As at December 31, 2016

	Pre-1992	Post-1991	Total
Actuarial Value of Assets			
Market value	$ 750,400	$ 3,598,900	$ 4,349,300
Smoothing adjustment	(12,000)	(37,200)	(49,200)
Total actuarial value of assets	**$ 738,400**	**$ 3,561,700**	**$ 4,300,100**
Actuarial Liability			
Present value of accrued benefits for:			
Active and suspended members	$ 124,800	$ 2,262,400	$ 2,387,200
Deferred vested members	9,900	197,200	207,100
Amounts held on deposit	1,100	1,700	2,800
Retired members and beneficiaries	1,467,600	1,338,700	2,806,300
Total Liabilities	**$ 1,603,400**	**$ 3,800,000**	**$ 5,403,400**
Actuarial Excess/(Unfunded Liability)	**$ (865,000)**	**$ (238,300)**	**$ (1,103,300)**
Funded Ratio	0.4605	0.9373	0.7958
Government share of unfunded liability	$ 257,800	$ 0	$ 257,800
Members' and employers' share of unfunded liability	$ 607,200	$ 238,300	$ 845,500

On the basis of the plan provisions, membership data, going concern assumptions and methods and asset information described in the Appendices, the going concern normal cost of the Plan as at December 31, 2016 is shown in the following table. The normal cost as at December 31, 2014 is also shown for comparison purposes.

Going Concern Normal Cost in the 12 Months Following the Valuation Date (000's)

	December 31, 2016	December 31, 2014
Total Normal Cost	**$ 198,200**	**$ 169,400**
Estimated pensionable earnings (in year following valuation date)	$ 920,800	$ 845,700
Total Normal Cost		
As a % of total pensionable earnings	21.52%	20.03%

Change in Financial Position

During the period from December 31, 2014 to December 31, 2016, the going concern financial position of the Plan changed from an unfunded liability of $1,209.0 million to an unfunded liability of $1,103.3 million. The major components of this change are summarized in the following table.

Reconciliation of the Going Concern Financial Position
For the Period from December 31, 2014 to December 31, 2016 ($000's)

	Pre-92	Post-91	Total
Actuarial Excess/(Unfunded Liability) as at December 31, 2014	**$ (900,600)**	**$ (308,400)**	**$ (1,209,000)**
Expected interest on actuarial excess/(unfunded liability)	(110,400)	(37,800)	(148,200)
Special payments with interest	82,800	106,700	189,500
Expected Actuarial Excess/(Unfunded Liability) as at December 31, 2016	**$ (928,200)**	**$ (239,500)**	**$ (1,167,700)**
Change in financial position due to experience gains/(losses)			
Gain/(loss) from investment experience	70,700	207,000	277,700
Contributions less than normal cost	0	(44,100)	(44,100)
Gain/(loss) due to salary increases	(1,300)	(19,900)	(21,200)
Gain/(loss) due to retirement experience	16,100	9,700	25,800
Gain/(loss) due to termination experience	400	19,300	19,700
Gain/(loss) due to mortality experience	(2,800)	(700)	(3,500)
Gain/(loss) due to indexation experience	21,800	16,500	38,300
Net gain/(loss) due to other experience	4,000	600	4,600
Actuarial Excess/(Unfunded Liability) After Experience Gains/(Losses) as at December 31, 2016	**$ (819,300)**	**$ (51,100)**	**$ (870,400)**
Change in liabilities due to assumption changes			
Change in 2-year salary assumption	1,000	20,400	21,400
Change in commuted value discount rate	0	(16,700)	(16,700)
Change in interest on employee contributions	0	800	800
Change in discount rate assumption	(46,700)	(191,700)	(238,400)
Actuarial Excess/(Unfunded Liability) as at December 31, 2016	**$ (865,000)**	**$ (238,300)**	**$ (1,103,300)**

Reconciliation of Normal Cost

The total normal cost as a percentage of pensionable earnings has increased from 20.03% at December 31, 2014 to 21.52% at December 31, 2016. A reconciliation of this change is shown in the table below:

Normal cost at December 31, 2014	20.03%
Plan data and experience different from expected since previous valuation	0.16%
Change in 2-year salary assumption	(0.22%)
Change in assumptions for commuted value settlement amounts	0.27%
Change in contribution interest rate assumption	(0.02%)
Change in discount rate assumption	1.30%
Normal cost at December 31, 2016	**21.52%**

Discussion of Experience Gains and Losses

Investment Earnings

The annualized rate of return earned by the pension fund based on the Actuarial Value of Assets for the valuation period from December 31, 2014 to December 31, 2016 was 9.54% per year. The assumed rate of return for going concern valuation purposes is 5.95% per year. An actual rate of return greater than the assumed rate resulted in a net actuarial gain of $277.7 million.

Current Service Contributions

The cost of benefits earned for the two-year period from December 31, 2014 to December 31, 2016 was greater than the current service contribution remitted to the Plan for the same period by $44.1 million. This loss was primarily due to the timing of contribution rates changes from December 31, 2014 to December 31, 2016.

Membership Experience

Over the inter-valuation period, there were actuarial gains and losses as shown on page 12 due to terminations, retirements and mortality different than expected. This is due to the differences in actual versus assumed decrements shown in the following table, as well as the prescribed transfer value basis which produced lump sum payouts greater than the liability held on the going concern basis.

Analysis of Experience During Intervaluation Period

	Actual	Assumed
Average annual actuarial investment return, net of expenses	9.54%	5.95%
Average annual salary increase	4.35%	3.44%
Average annual YMPE increase	1.57%	2.75%
Average annual Maximum Pensionable Earnings Increase	1.67%	2.75%
Average COLA	0.75%	1.35%
Membership experience:		
Terminations from active membership	577	595.3
Retirements from active membership	465	532.4
Average age of active retirements	63.1	63.2
Deaths from non-retired membership	17	29.4
Deaths from retired membership	211	220.3

Discussion of Changes in Assumptions

Effective December 31, 2016, the following assumptions were changed:

Economic Assumption

- The salary increase assumption for 2017 and 2018 was changed to 1.5% per annum plus merit and promotion from 2.75% per annum plus merit and promotion.
- The discount rate assumption was changed to 5.6% per annum from 5.95% per annum.
- The interest on employee contributions assumption was changed to 2.75% per annum from 3.0% per annum.
- The commuted value discount rate assumption was changed to 3.5% per annum from 4.25% per annum.

In combination, these changes in assumptions increased the going concern liabilities by $232.9 million and the total normal cost by $11.5 million.

Demographic Assumptions

- No change

Going Concern Valuation Sensitivity Results

In accordance with the Canadian Institute of Actuaries Standards of Practice specific to pension plans that became effective December 31, 2010, 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.

(000's)	Valuation Basis December 31, 2016	Based on Rate of 1% Lower	Effect $	Effect %
Going concern liabilities	$ 5,403,400	$ 6,201,100	$ 797,700	14.8%
Normal cost	$ 198,200	$ 242,100	$ 43,900	22.1%

The total going concern liabilities and the total normal cost are based on a nominal discount rate assumption of 5.6% per annum. Combined with an assumed inflation rate of 2.25% per annum, the real discount rate assumption is 3.35% per annum. The table above presents the impact of reducing the nominal discount rate assumption by 1% per annum to 4.6% per annum, which means the real discount rate assumption is lowered from 3.35% per annum to 2.35% per annum.

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

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 *EPPA* and is performed in accordance with requirements prescribed by that legislation. It is intended to provide an assessment of the Plan's financial position at the valuation date on the premise that certain obligations as prescribed by the *EPPA* are settled on the valuation date for all members. The *EPPA* does not require funding based on the solvency valuation results.

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 *EPPA*, the solvency financial position of the Plan as at December 31, 2016 is shown in the following table. The solvency financial position of the Plan as at December 31, 2014 is shown for comparison purposes.

Solvency Financial Position (000's)

	December 31, 2016	December 31, 2014
Assets		
Market Value of assets	$ 4,349,300	$ 3,767,600
Estimated wind up expenses	(2,900)	(2,700)
Solvency Assets	**$ 4,346,400**	**$ 3,764,900**
Solvency Liabilities		
Active members	$ 4,015,800	$ 3,632,400
Deferred vested members	328,700	296,300
Amounts held on deposit	2,800	2,900
Retired members and beneficiaries	3,721,000	3,486,900
Total Liabilities	**$ 8,068,300**	**$ 7,418,500**
Solvency Excess/(Deficiency)	**$ (3,721,900)**	**$ (3,653,600)**
Solvency ratio	0.5387	0.5075

The financial position as at December 31, 2016 on a solvency basis split for service pre and post January 1, 1992 is as follows:

Financial Position – Solvency Basis (000's)

	As at December 31, 2016		
	Pre-1992	**Post-1991**	**Total**
Assets			
Market value of assets	$ 750,400	$ 3,598,900	$ 4,349,300
Wind-up expenses	0	(2,900)	(2,900)
Actuarial value of assets	**$ 750,400**	**$ 3,596,000**	**$ 4,346,400**
Liabilities			
Active and suspended members	$ 202,400	$ 3,813,400	$ 4,015,800
Deferred vested members	13,700	315,000	328,700
Amounts held on deposit	1,100	1,700	2,800
Retired members and beneficiaries	1,875,300	1,845,700	3,721,000
Total Liabilities	**$ 2,092,500**	**$ 5,975,800**	**$ 8,068,300**
Solvency excess (deficiency)	**$ (1,342,100)**	**$ (2,379,800)**	**$ (3,721,900)**
Solvency Ratio	0.3586	0.6018	0.5387

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 by $3,721.9 million. This calculation includes a provision of $2.9 million for termination expenses that might be payable from the pension fund if the plan were wound up.

Part of this deficiency would be shared by the Government of Alberta in respect of pre-1992 service.

Solvency Valuation Sensitivity Results

In accordance with the Canadian Institute of Actuaries Standards of Practice specific to pension plans that became effective December 31, 2010, 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.

(000's)	Valuation Basis December 31, 2016	Based on Rate of 1% Lower	Effect $	Effect %
Solvency liabilities	$ 8,068,300	$ 9,429,700	$ 1,361,400	16.9%

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, 2016 of the expected aggregate change in the solvency liabilities between December 31, 2016 and the next calculation date, that is December 31, 2019. 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, 2016 to December 31, 2019, is $1,332.1 million.

(000's)	2017	2018	2019
Incremental cost on a solvency basis	$ 443,900	$ 444,500	$ 443,700

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 range in accordance with legislative requirements is certified; and
- An estimate of the normal cost for the 12 months following the valuation date.

(000's)		**2017**		**2015**
Total Normal Cost	**$**	**198,200**	**$**	**169,400**
Total pensionable earnings	$	920,800	$	845,700
Total Normal Cost				
As a % of pensionable earnings		21.52%		20.03%

In the event an updated funding range in accordance with legislative requirements is not certified before December 31, 2019, the rule for determining the total normal cost contributions outlined in the above table will continue to be appropriate for the plan year commencing on the next valuation date of December 31, 2019. Adjustment to the total contributions may be required once the next actuarial funding range in accordance with legislative requirements is certified.

Development of Special Payments

Due to the different funding arrangements in place for unfunded liabilities relating to service before and after January 1, 1992, the special payments for these two periods are determined separately, as shown in this section.

The amortization schedules for unfunded liabilities were developed using the going concern interest rate of 5.6% per annum compounded annually in arrears with monthly payments; total payroll increases of 2.75% for two years and 4.0% thereafter (the assumed base salary increase plus 0.5% per annum for additional increases and 0.75% per annum headcount growth rate) have been used for the pre-1992 and post-1991 amortization schedules.

Special Payments in Respect of the Pre-1992 Unfunded Liability

Under the terms of the Plan and the *Public Sector Pension Plans Act* which, in accordance with the *EPPA*, remain in effect, additional contributions will be made by the Government of Alberta, plan members, and employers to eliminate the Plan's unfunded liability in respect of pre-1992 service and the benefits that were in place, as at December 31, 1991. These contributions are to be determined such that the pre-1992 unfunded liability will be eliminated on or before December 31, 2043 and will be split between the three parties as follows:

	Percent of Total
Government	1.25% of total payroll
Members and Employers	Each, 50% of remaining balance
Total	100%

The following table summarizes the previously established amortization schedules of pre-1992 going concern special payments before adjustment to reflect any gains or losses revealed in the going concern results.

				Present Value as of December 31, 2016
	Date of Last Payment	**Special Payment as % of Pensionable Earnings**	**Annual Special Payment (000's)**	**For Going Concern Valuation (000's)** [1]
Government contributions	31-Dec-2043	1.25%	$ 12,170	$ 257,800
Member contributions	31-Dec-2043	1.77%	17,230	365,000
Employer contributions	31-Dec-2043	1.77%	17,230	365,000
Total		**4.79%**	**$ 46,630**	**$ 987,800**

[1] The values in the table were developed using the going concern interest rate of 5.6% per annum compounded annually in arrears with monthly payments

As at December 31, 2016, the pre-1992 unfunded liability is $865.0 million. The following table summarizes the amortization schedules of pre-1992 going concern special payments after adjustment to reflect net gains revealed in the going concern results.

	Date of Last Payment	Special Payment as % of Pensionable Earnings	Annual Special Payment (000's)	Present Value as of December 31, 2016 For Going Concern Valuation (000's) [1]
Previously established special payments up to and including June 30, 2018				
Government contributions	31-Dec-2043	1.25%	$ 12,170	$ 17,600
Member contributions	30-June-2018	1.77%	17,230	25,000
Employer contributions	30-June-2018	1.77%	17,230	25,000
Total contributions up to June 30, 2018		**4.79%**	**$ 46,630**	
Revised special payments from July 1, 2018				
Government contributions	31-Dec-2043	1.25%	$ 12,170	$ 240,200
Member contributions	31-Dec-2043	1.45%	14,120	278,600
Employer contributions	31-Dec-2043	1.45%	14,120	278,600
Total		**4.15%**	**$ 40,410**	**$ 865,000**

The special payment schedule effective December 31, 2016, is calculated on the assumption that contribution changes take effect July 1, 2018. Until then, the existing pre-1992 contribution schedule of 4.79% of pay will remain in place. The percentage of pensionable earnings is calculated as a level percentage of pay through to the last payment date, assuming pensionable earnings grow at 2.75% per annum for 2 years after the valuation date and 4.0% per annum thereafter.

Note that pre-1992 additional contributions are payable as a percentage of total unannualized earnings, whereas normal cost contributions and post-1991 unfunded liability special payments are payable as a percentage of capped pensionable earnings.

[1] The values in the table were developed using the going concern interest rate of 5.6% per annum compounded annually in arrears with monthly payments

Special Payments in Respect of the Post-1991 Unfunded Liability

Under the terms of the Plan, any unfunded liability in respect of post-1991 service shall be funded in accordance with the *EPPA*. Since the Plan has an unfunded liability with respect to post-91 service, special payments must be made in order to eliminate the deficiency over no more than 15 years from the date that the unfunded liability was established.

The following table summarizes previously established amortization schedules of post-1991 going concern special payments before adjustment to reflect any gains or losses due to the going concern results.

	Effective Date	End Date	Special Payment as % of Capped Earnings	Annual Special Payment (000's)	Present Value as of December 31, 2016 For Going Concern Valuation (000's) [1]
Member contributions	31-Dec-2006	31-Dec-2021	0.11%	$ 1,010	$ 4,700
Employer contributions	31-Dec-2006	31-Dec-2021	0.11%	1,010	4,700
Member contributions	31-Dec-2008	31-Dec-2021	1.50%	13,810	64,000
Employer contributions	31-Dec-2008	31-Dec-2021	1.50%	13,810	64,000
Member contributions	31-Dec-2008	31-Dec-2023	0.505%	4,650	29,700
Employer contributions	31-Dec-2008	31-Dec-2023	0.505%	4,650	29,700
Member contributions	31-Dec-2010	31-Dec-2025	0.225%	2,070	16,700
Employer contributions	31-Dec-2010	31-Dec-2025	0.225%	2,070	16,700
Member contributions	31-Dec-2012	31-Dec-2027	0.125%	1,150	11,200
Employer contributions	31-Dec-2012	31-Dec-2027	0.125%	1,150	11,200
Total			**4.93%**	**$ 45,380**	**$ 252,600**

[1] The values in the table were developed using the going concern interest rate of 5.6% per annum compounded annually in arrears with monthly payments

As at December 31, 2016, the post-1991 unfunded liability is $238.3 million. The following table summarizes the amortization schedules of post-1991 going concern special payments after adjustment to reflect any gains or losses due to the going concern results.

	Effective Date	End Date	Special Payment as % of Capped Earnings	Annual Special Payment (000's)	Present Value as of December 31, 2016 For Going Concern Valuation (000's) [1]
Previously established special payments up to and including June 30, 2018					
Member contributions	31-Dec-2014	30-June-2018	2.465%	$ 22,700	$ 32,900
Employer contributions	31-Dec-2014	30-June-2018	2.465%	22,700	32,900
Total contributions up to June 30, 2018			4.930%	$ 45,400	
Revised special payments from July 1, 2018					
Member contributions	31-Dec-2008	31-Dec-2021	1.365%	12,590	40,100
Employer contributions	31-Dec-2008	31-Dec-2021	1.365%	12,590	40,100
Member contributions	31-Dec-2008	31-Dec-2023	0.505%	4,650	22,950
Employer contributions	31-Dec-2008	31-Dec-2023	0.505%	4,650	22,950
Member contributions	31-Dec-2010	31-Dec-2025	0.225%	2,070	13,700
Employer contributions	31-Dec-2010	31-Dec-2025	0.225%	2,070	13,700
Member contributions	31-Dec-2012	31-Dec-2027	0.125%	1,150	9,500
Employer contributions	31-Dec-2012	31-Dec-2027	0.125%	1,150	9,500
Total			**4.44%**	**$ 40,920**	**$ 238,300**

The special payment schedule effective December 31, 2016, is calculated on the assumption that the existing contribution rates continue until June 30, 2018, with reduced contributions commencing on July 1, 2018. The percentage of pensionable earnings is calculated as a level percentage of capped pensionable earnings through to the last payment date, assuming pensionable earnings grow at 2.75% per annum for 2 years after the valuation date and 4.0% per annum thereafter.

In determining the contributions after June 30, 2018, the oldest amortization payments were reduced, resulting in amortization of the post-1991 unfunded liability over the longest period allowed by the EPPA.

[1] The values in the table were developed using the going concern interest rate of 5.6% per annum compounded annually in arrears with monthly payments

Excess Surplus

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

Since the Plan has an unfunded liability, there is no excess surplus and therefore it does not impact the development of the total contribution requirements.

Total Contributions

The minimum amount under the *EPPA* and the maximum amount, under the *ITA* that the member and employer must contribute are described in Appendix A.

The member and employer contributions recommended in this valuation report are at least equal to the legislated minimum requirements and do not exceed the legislated maximum requirements.

The minimum and maximum member and employer contributions to the Plan each year, as a percentage of the applicable earnings amount, are shown in the following table.

	Minimum Required Under the *EPPA*	**Maximum Permitted Under the *ITA***
Pre-1992 unfunded liability		
▪ Government	1.25%	1.25%
▪ Members and employers	2.90%	22.51%
Post-1991 unfunded liability	4.44%	6.92%
Solvency deficiency	0.00%	70.37%
Post-1991 normal cost	21.52%	21.52%
Total		
▪ Government	1.25%	1.25%
▪ Members and employers	28.86%	121.32%

The minimum permitted under the *EPPA* column illustrates the minimum amount of funding that would be required for the period July 1, 2018 to the effective date of the contribution recommendation contained in the next actuarial valuation to meet the *EPPA's* funding requirements, expressed as a percentage of pay. The maximum permitted under the *ITA* column represents the maximum amount of funding that would be permitted under the *ITA* for the period January 1, 2017 to December 31, 2020, expressed as a level percentage of pay each year.

Based on the results of the valuation, the Board has adopted a 0.36% increase in total employer and member contribution rates. The total employer and member contribution rate will increase from 28.50% to 28.86% effective July 1, 2018.

The new contribution rates effective July 1, 2018 are shown in the following table. Note that the employers pay matching contributions except at Athabasca University and the Banff Centre where employers contribute 1.0% more than members.

New Contribution Rates effective July 1, 2018

	Equal Share		Employer = Members + 1%	
	Member	**Employer**	**Member**	**Employer**
Pre-1992 unfunded liability additional contributions	1.45%	1.45%	1.45%	1.45%
Post-1991 unfunded liability amortization payments	2.22%	2.22%	2.22%	2.22%
Normal cost				
-earnings below YMPE	8.79%	8.79%	8.29%	9.29%
-earnings above YMPE	12.56%	12.56%	12.06%	13.06%
Total Contributions				
On earnings below YMPE	12.46%	12.46%	11.96%	12.96%
On earnings above YMPE, but less than pensionable salary cap	16.23%	16.23%	15.73%	16.73%
On earnings above pensionable salary cap	1.45%	1.45%	1.45%	1.45%

Note that pre-1992 additional contributions are payable as a percentage of total earnings, whereas the normal cost contributions and post-1991 unfunded liability special payments are payable as a percentage of capped pensionable earnings.

The amortization schedules for unfunded liabilities were developed using the going concern interest rate of 5.6% per annum compounded annually in arrears with monthly payments. Capped pensionable earnings are assumed to grow at 2.75% per annum for 2 years after the valuation date and 4.0% per annum thereafter (the assumed base salary increase plus 0.5% per annum for additional increases and 0.75% per annum for headcount growth). Total earnings used to determine the pre-1992 additional contributions are assumed to grow at the same rates as those used for the post-1991 amortization payments.

Section 5: Actuarial Certificate

Actuarial Opinion, Advice and Certification for the Universities Academic Pension Plan

Canada Revenue Agency Registration Number: 0339572

Opinion

This actuarial certification forms an integral part of the actuarial valuation report for the Plan as at December 31, 2016. We confirm that we have prepared an actuarial valuation of the Plan as at December 31, 2016 for the purposes outlined in the Introduction section to this report and consequently:

Our advice on funding is the following:

- Contributions should be made within the range of minimum and maximum contribution amounts as outlined in Section 4 of this report, in accordance with legislative requirements.
- The next actuarial valuation for the purpose of developing funding requirements should be performed no later than as at December 31, 2019.

We hereby certify that, in our opinion:

- With respect to the purposes of determining the Plan's financial position on a going concern basis as at December 31, 2016:
  - The Plan has a going concern unfunded liability of $1,103.3 million as at December 31, 2016, based on going concern assets of $4,300.1 million less going concern liabilities of $5,403.4 million.
  - There is no excess surplus as defined by Section 147.2(2) of the *ITA* in the Plan at December 31, 2016.
  - The going concern funded ratio is 0.7958 as at December 31, 2016.
- With respect to the purpose of determining the Plan's financial position on a solvency basis:
  - The Plan has a solvency deficiency of $3,721.9 million as at December 31, 2016, determined as solvency assets net of windup expenses of $4,346.4 million less solvency liabilities of $8,068.3 million.
  - The solvency ratio is 0.5387 as at December 31, 2016.
  - The Plan's liabilities would exceed the Plan's assets, net of estimated wind up expenses, by $3,721.9 million if the Plan was terminated and wound up as at December 31, 2016.

- With respect to determining the funding requirements of the Plan:
  - The rule for determining the total normal cost of the Plan for the 12 months following the valuation date is 21.52% of pensionable earnings.
  - The estimated total normal cost is as follows:

		2017
Total Normal Cost	**$**	**198,200**
Total pensionable earnings	$	920,800
Total Normal Cost		
As a % of pensionable earnings		21.52%

  - The minimum special payments and additional contributions effective July 1, 2018 until the next actuarial opinion, as a percentage of earnings, are summarized in the following table:

Minimum Special Payments and Additional Contributions for Unfunded Liability

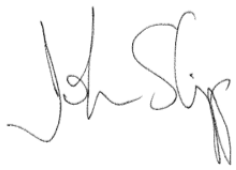
	Pre-1992	**Post-1991**	**Annual Special Payment as % of Pensionable Earnings**
Government	1.25%	n/a	1.25%
Member	1.45%	2.22%	3.67%
Employer	1.45%	2.22%	3.67%
	4.15%	**4.44%**	**8.59%**

Note that contributions with respect to the pre-1992 unfunded liability are expressed as a percentage of total earnings, and contributions with respect to the post-1991 unfunded liability are expressed as a percentage of capped pensionable earnings. The complete amortization schedules with respect to the unfunded liabilities are shown in Section 4.

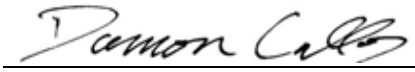
  - The total maximum special payments and additional contributions from January 1, 2017 to December 31, 2020, as a percentage of earnings each year are 23.76% for the pre-1992 unfunded liability, 6.92% for the post-1991 unfunded liability, and 70.37% for the solvency deficiency. Note that contributions with respect to the pre-1992 unfunded liability are expressed as a percentage of total earnings, and contributions with respect to the solvency deficiency and post-1991 unfunded liability are expressed as a percentage of capped pensionable earnings.
  - The contribution range as outlined in this report is expected to be sufficient to satisfy the Plan's funding requirements.
  - The contribution range outlined in this report qualifies as eligible contributions under Section 147.2(2) of the *ITA.*

  - The member contributions recommended in this report exceed the limits imposed by paragraph 8503(4)(a) of the *Income Tax Regulations*, however we will apply for a ministerial waiver in accordance with paragraph 8503(5) of the *Income Tax Regulations*. Upon approval by the Minister, the member contributions recommended in this report will be eligible contributions.

- In our opinion, for the purposes of the valuation:
  - The data on which this valuation is based are sufficient and reliable;
  - The assumptions used are appropriate; and
  - The actuarial cost methods and the asset valuation methods used are appropriate.
- This report and its associated work have been prepared, and our opinion given, in accordance with accepted actuarial practice in Canada and in compliance with the requirements outlined in subparagraphs 147.2(2)(a)(iii) and (iv) of the *ITA*.
- Notwithstanding the above certifications, emerging experience differing from the assumptions will result in gains or losses that will be revealed in subsequent valuations.



John Slipp, FCIA, FSA
Associate Partner



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December 27, 2017

Appendix A: Glossary of Terms

- The **actuarial excess/(unfunded liability)** is the difference between the actuarial value of assets and the going concern liabilities.
- The **actuarial value of assets** is the asset value used for going concern valuation purposes. Smoothing methods are sometimes used to smooth investment gains and losses over a certain period.
- The **estimated wind up expenses** is an estimate of the administrative and other expenses expected to be charged against the pension fund if the Plan were to terminate on the valuation date.
- The **going concern funded ratio** compares the actuarial value of assets to the going concern liabilities for the purposes of Section 38(2)(c) of the *EPPA* and *EPPA Update 14-05* to determine the latest effective date of the next required valuation.
- The **going concern liabilities** are the actuarial present value of benefits earned in respect of service prior to the valuation date. The going concern liabilities are calculated using the going concern assumptions and methods summarized in Appendix D of this report.
- The **going concern position** is the difference between the actuarial value of assets and the going concern liabilities.
- The **maximum deductible employer contribution** refers to an eligible contribution pursuant to Section 147.2(2) of the *ITA*. Under Subsection 8502(b) of the Regulations to the *ITA*, each employer contribution made after 1991 in respect of a defined benefit provision of a registered pension plan must be such eligible contribution.

  In an employer's fiscal year, the following contributions are eligible under Section 147.2 of the *ITA*.

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

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

  – Required application of excess surplus.

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

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

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

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

- The **minimum required employer contribution** for each plan year is equal to:
  - The employer normal cost; plus
  - Special payments toward amortizing any post-1991 unfunded liability over 15 years from the date on which the unfunded liability was established; plus
  - Special payments toward amortizing any pre-1992 unfunded liability over the period ending December 31, 2043; less
  - Required application of excess surplus; less
  - Permitted application of excess assets.

  In order to satisfy the requirements of the *EPPA* and its Regulations, contributions to the fund must be made in accordance with the following rules:
  - Required member contributions (if any) must be remitted to the pension fund within 30 days following the month in which the contributions were received from the member or deducted from his or her remuneration.
  - Employer contributions must be remitted to the pension fund within 30 days after the end of the month for which the contributions are payable.
- **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, less estimated wind-up expenses
- 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 determined using benefit entitlements on the assumption that the Plan has neither an actuarial excess nor a deficit. The solvency liabilities are calculated using the solvency valuation assumptions summarized in Appendix E of this report.
- The **solvency position** is the difference between the solvency assets (net of estimated wind up expenses) and the solvency liabilities.
- The **solvency ratio** compares the solvency assets less estimated wind up expenses to the solvency liabilities . If the solvency ratio is less than 1.00, lump-sum transfer from the pension fund under the *EPPA* are limited to the commuted value of the member's pension multiplied by the solvency ratio. The administrator may transfer the entire commuted value if the administrator is satisfied that an amount equal to the transfer deficiency has been remitted to the pension fund or other certain conditions are met.
- The **special payments** are payments required to liquidate the unfunded liability:
  - The going concern special payments are payments required to liquidate the unfunded liability, with interest at the going concern valuation discount rate, over a period of 15 years on the valuation date of the report in which the going concern unfunded liability was determined. The going concern special payments are determined by calculating the level percentage of pensionable earnings commencing 18 months following the valuation date and continuing for 13.5 years (15 years after the valuation date). Pre-1992 unfunded liabilities for the Plan are amortized over the period ending December 31, 2043 as shown in Section 4.

- 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 going concern valuation assumptions and methods summarized in Appendix D of this report.

Appendix B: Assets

Asset Data

The Plan assets are held in trust by the Board and are invested by Alberta Investment Management Corporation (AIMCo), Beutel Goodman and Fiera Capital in accordance with the Statement of Investment Policies and Goals (SIP&G) approved by the Board. At the asset class level, the Plan's investments are managed for purposes of evaluating the Plan's risk exposure and investment performance against approved benchmarks based on market value. The Plan's investments are primarily invested in pooled funds managed by AIMCo.

This type of trust arrangement governs only the investment of the assets deposited into the fund and in no way guarantees the benefits provided under the Plan or the costs of providing such benefits. Any excess income or, in fact, any other profit caused by the actual Plan experience varying from the actuarial assumptions will accrue to the fund. It is, of course equally true that any losses due to variations of actual experience from the actuarial assumptions will emerge as a liability of the Plan, which will either cause a reduction in the surplus generated from other sources or require an increase in contributions to maintain the same benefit level.

The asset information presented in this report is based on the audited financial statements of the Plan for 2015 and 2016, and additional asset data obtained from staff of the Board.

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

- A reconciliation of actual cash flow with expected cash flow from the previous actuarial report; and
- A reconciliation of any anticipated benefit payments in 2015 and 2016 (for retirees, terminated or deceased employees) against the financial statements of the pension fund for confirmation of payments.

Market Value of Assets

The following is a summary of the market values of the fund as reported in the Plan's financial statements as at December 31, 2016. For comparison purposes, the composition at the previous valuation date of December 31, 2014 is also shown.

(000's)	December 31, 2016	December 31, 2014
Invested Assets	$ 4,329,190	$ 3,748,524
Net receivables and payables	20,085	19,050
Market Value	**$ 4,349,275**	**$ 3,767,574**

Asset Allocation

The following is a summary of the allocation of the Plan's invested assets:

	2016		2014	
(000's)	**Fair Value**	**%**	**Fair Value**	**%**
Interest-bearing securities				
Cash and short-term securities	$ 33,911	0.8%	$ 12,765	0.3%
Bonds and mortgages	904,907	20.9%	892,624	23.8%
Real return bonds	308,414	7.1%	243,921	6.5%
	1,247,232	**28.8%**	**1,149,310**	**30.6%**
Equities				
Canadian public equities	836,180	19.3%	656,306	17.5%
Foreign public equities	1,322,572	30.6%	1,169,061	31.2%
Emerging markets equities	343,392	7.9%	285,767	7.6%
	2,502,144	**57.8%**	**2,111,134**	**56.3%**
Alternative investments				
Real estate	354,717	8.2%	275,531	7.4%
Infrastructure and private debt/loans	138,676	3.2%	144,731	3.9%
Timberland	36,962	0.9%	30,675	0.8%
	530,355	**12.3%**	**450,937**	**12.1%**
Strategic opportunities and currency overlays	**49,459**	**1.1%**	**37,143**	**1.0%**
Total Invested Assets	**$4,329,190**	**100.0%**	**$3,748,524**	**100.0%**

Target Asset Mix

The target asset mix of the Plan is contained in the Plan's Statement of Investment Policies and Goals and is as follows:

Asset Class	Benchmark	Interim Policy Weight	Long-term Policy Weight	Allowable Range
Fixed Income				
Cash and Short-term	FTSE TMX 91 Day T-bill Index	0.0%	0.0%	0%-1%
Canadian Bonds (Universe)	FTSE TMX Universe Bonds	11.5%	11.5%	8%-14%
Long-term Canadian Bonds	FTSE TMX Long Bond Index	11.5%	11.5%	8%-14%
Mortgages	FTSE TMX Universe Bonds + 100 bps	5.0%	5.0%	3%-7%
Real Rate of Return Bonds	FTSE TMX Real Return Index	7.0%	7.0%	5%-9%
		35.0%	**35.0%**	**26%-41%**
Equities				
Canadian Equities	S&P/TSX Composite Capped Index	16.0%	12.0%	10%-20%
Global Equities	MSCI World Total Return Index	28.0%	26.0%	22%-31%
Emerging Markets Equities	MSCI Emerging Markets Index, Net	8.0%	7.0%	5%-9%
		52.0%	**45.0%**	**40%-60%**
Alternatives				
Real Estate	ICREIM/IPD Large Institutional All Property Index	8.0%	8.0%	5%-11%
Private Equity	CPI + 650 bps	0.0%	5.0%	0%-7%
Infrastructure	CPI + 600 bps	4.0%	7.0%	3%-9%
Timberland	CPI + 400 bps	1.0%	0.0%	0%-1%
		13.0%	**20.0%**	**12%-25%**
Total Investments		**100.0%**	**100.0%**	

Effective January 1, 2017, the asset portfolio is in transition from the interim policy weights to the long-term policy weights.

Reconciliation of Changes in Market Value of Assets

The table below reconciles changes in the market value of assets between December 31, 2014 and December 31, 2016.

(000's)	2015	2016
Market Value of Assets, Beginning of Plan Year	**$ 3,767,574**	**$ 4,043,654**
Contributions During Plan Year		
Employer	$ 113,568	$ 122,502
Member	113,458	122,435
Prior service	2,680	2,824
Government	11,155	11,592
Total	**$ 240,861**	**$ 259,353**
Benefit Payments During Plan Year		
Non-retired members[1]	$ (32,173)	$ (15,873)
Retired members	(211,414)	(220,463)
Total	**$ (243,587)**	**$ (236,336)**
Fees/Expenses		
Investment fees/expenses	$ (13,777)	$ (10,678)
Non-investment fees/expenses	(2,121)	(2,152)
Total	**$ (15,898)**	**$ (12,830)**
Investment Income	**$ 294,704**	**$ 295,434**
Market Value of Assets, End of Plan Year	**$ 4,043,654**	**$ 4,349,275**
Rate of return, net of fees/expenses	7.5%	7.0%

[1] Includes members who have terminated employment or died

Development of Actuarial Value of Assets

The method to determine the actuarial value of assets is described in Appendix D. The development of the actuarial value of assets as of December 31, 2016 is shown below:

Actuarial Value of Assets (Three-Year Average Market Value) ($ millions)

	Pre-1992	Post-1991	Total
Market value at January 1, 2015	**$ 824.9**	**$ 2,942.7**	**$ 3,767.6**
Contributions	37.1	203.8	240.9
Benefit Payments & Expenses	(133.9)	(111.8)	(245.7)
Assumed Investment Income (at 5.95% per annum)	46.2	177.8	224.0
Projected value at December 31, 2015	774.3	3,212.4	3,986.7
Contributions	41.6	217.8	259.4
Benefit Payments & Expenses	(133.9)	(104.6)	(238.5)
Assumed Investment Income (at 5.95% per annum)	43.3	194.5	237.8
Projected value at December 31, 2016 (A)	**$ 725.3**	**$ 3,520.1**	**$ 4,245.4**
Market value at January 1, 2016	**$ 787.6**	**$ 3,256.1**	**$ 4,043.7**
Contributions	41.6	217.8	259.4
Benefit Payments & Expenses	(133.9)	(104.6)	(238.5)
Assumed Investment Income (at 5.95% per annum)	44.1	197.1	241.2
Projected value at December 31, 2016 (B)	**$ 739.4**	**$ 3,566.3**	**$ 4,305.7**
Market Value of Assets at December 31, 2016 (C)	**$ 750.4**	**$ 3,598.9**	**$ 4,349.3**
Actuarial Value of Assets at December 31, 2016			
Smoothed Market Value (average of A, B, and C)	$ 738.4	$ 3,561.7	$ 4,300.1
Minimum actuarial value (90% of market value)	675.4	3,239.0	3,914.4
Maximum actuarial value (110% of market value)	825.4	3,958.8	4,784.2
Capped Actuarial Value of Assets	**$ 738.4**	**$ 3,561.7**	**$ 4,300.1**

Appendix C: Membership Data

Source of Data

This funding valuation was based on member data provided by Conduent HR Services, and staff of the Board as of December 31, 2016. Tests of the sufficiency and reliability of the member data were performed and the results were satisfactory. The tests included:

- A reconciliation of membership status against the membership status at the last valuation. This test was performed to ensure that all members were accounted for. A summary of this reconciliation follows on the next page;
- A reconciliation of birth, hire, and participation dates against the corresponding dates provided for the last valuation to ensure consistency of data;
- A reconciliation of credited service against the corresponding amount provided for the last valuation to ensure that no member accrued more than 2 years of credited service from December 31, 2014, notwithstanding increases due to service purchases during the inter-valuation period. This test also revealed any members who had any unexpected changes in service, such as having accrued less than 2 years of credited service or had no change in credited service;
- A reconciliation of pensionable earnings against the corresponding amounts provided for the last valuation to identify any unusual increases or decreases (more than 15% per annum);
- A reconciliation of accrued benefits against the corresponding amounts provided for the last valuation to identify any unusual benefit accruals;
- A reconciliation of any stated benefit payments in 2015 and 2016 (for retired, terminated or deceased employees) against the financial statements of the pension fund for confirmation of the payments; and
- A reconciliation of inactive member benefit amounts against the corresponding amounts provided for the last valuation to ensure consistency of data.

The following information was missing, and assumptions were made as follows with respect to such missing data:

- Annualization of Pensionable Earnings: Since the data provided did not include annualized earnings for some members, earnings were annualized using actual earnings and in-year service where required. Annualized earnings for the first year after the valuation date (2017) were increased by an assumed rate of 1.0% plus Seniority, Merit and Promotion from those provided for 2016.
- Earnings: If earnings were available for 2010 to 2015, the most recent data was utilized and increased to 2016 using the salary increase assumptions from the previous valuation.
- Service Ratios: If the service ratio was blank we assumed a service ratio of 1.0.
- Detail in Financial Information: Due to the nature of the financial information, it was not possible to trace the refunds individually for every terminating member. The potential effect of this data omission was immaterial to the overall results of the valuation; however, it could affect the gain/loss analysis.
- Pension Amounts: For members included in active member data with termination dates before the valuation date we have calculated the value of benefits based on available active member data.

- Pension Amounts for Pensioners: Current pension amounts in-pay were provided by UAPP staff, and included actual pension indexing up to January 1, 2017. Any incomplete data was supplemented with the pensioner data provided by Conduent HR Services.

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

Membership Summary

The table below reconciles the number of members as of December 31, 2016 with the number of members as of December 31, 2014 and the changes due to experience in the period.

	Active and Suspended Members	Deferred Vested Members	HODs	Pensioners and Survivors	Total
Members, December 31, 2014	**7,580**	**1,459**	**316**	**4,757**	**14,112**
Changes due to:					
New entrants	1,464	0	0	0	1,464
Termination					
Non-vested	(2)	0	2	0	0
Deferred vested	(414)	414	0	0	0
Lump sum	(232)	(115)	(20)	0	(367)
Death					
No further benefits	0	0	0	(121)	(121)
Lump sum	(3)	(3)	0	0	(6)
Surviving beneficiary	(10)	0	0	(90)	(100)
Expiry of guarantee period	0	0	0	(1)	(1)
New beneficiary	0	0	0	100	100
Retirement	(485)	(59)	0	544	0
Transfer	33	(28)	(2)	(3)	0
Data correction	(1)	21	(1)	(16)	3
Net change	350	230	(21)	413	972
Members, December 31, 2016	**7,930**	**1,689**	**295**	**5,170**	**15,084**

Active Members

	December 31, 2016	December 31, 2014
Number	7,930	7,580
Average age	48.8	48.8
Average credited service	10.1	9.9
Total expected 2017 unlimited earnings for members with a normal cost	$ 973,329,881	$ 891,057,116
Total expected 2017 capped earnings for members with a normal cost	$ 920,759,872	$ 845,726,480
Total expected 2017 annualized capped earnings for all members	$ 930,781,820	$ 850,004,271
Average expected 2017 annualized capped earnings for all members	$ 117,375	$ 112,138
Average expected 2017 annualized capped earnings for members with normal cost	$ 117,870	$ 112,773
Proportion female	48.2%	47.1%

Active and Suspended Members – Pre-1992 Service

	December 31, 2016	December 31, 2014
Number	572	734
Average age	61.8	60.6
Average pre-1992 pensionable service	4.9	5.6
Average expected 2017 annualized unlimited earnings for all members	$ 176,477	$ 167,263
Proportion female	29.4%	30.2%

Deferred Vested Members

	December 31, 2016	December 31, 2014
Number	1,689	1,459
Average age	48.8	48.4
Average annual pension	$ 8,283	$ 8,363
Average annual pre-1992 pension	$ 373	$ 542
Proportion female	49.6%	48.9%

Participants with Amounts Held-on-Deposit

	December 31, 2016	December 31, 2014
Number	295	316
Average age	57.0	55.1
Average contributions with interest	$ 9,313	$ 9,271
Proportion female	49.8%	48.4%

Pensioners and Survivors

	December 31, 2016	December 31, 2014
Number	5,170	4,757
Average age	73.1	72.5
Average annual pension	$ 43,668	$ 44,048
Average years since retirement	12.1	11.7
Proportion female	38.1%	32.9%

Pensioners and Survivors – Pre-1992 Pension

	December 31, 2016	December 31, 2014
Number	3,753	3,693
Average age	75.8	74.7
Average annual pre-1992 pension	$ 35,363	$ 35,841
Average years since retirement	14.8	13.9
Proportion female	32.1%	27.2%

Active and Suspended Membership Distribution

The following table provides a detailed summary of the active and suspended membership at the valuation date by years of credited service and by age group using expected average annualized capped 2017 earnings.

		Years of Credited Service								
Age		**< 5**	**5–10**	**10–15**	**15–20**	**20–25**	**25–30**	**30–35**	**>=35**	**Total**
< 25	Count	11								11
	Avg. earnings	$ 56,244								$ 56,244
25–30	Count	156	3							159
	Avg. earnings	$ 74,058	$ 86,084							$ 74,285
30–35	Count	462	61							523
	Avg. earnings	$ 88,385	$ 85,914							$ 88,256
35–40	Count	612	298	38	2					950
	Avg. earnings	$ 93,683	$105,368	$110,223	$103,816					$ 98,031
40–45	Count	474	468	242	37					1,221
	Avg. earnings	$ 97,325	$109,767	$118,975	$130,066					$107,377
45–50	Count	383	390	397	213	19	1			1,403
	Avg. earnings	$103,171	$112,312	$125,173	$138,290	$ *	$ *			$117,655
50–55	Count	270	293	293	357	113	26	2		1,354
	Avg. earnings	$110,481	$110,629	$126,621	$140,730	$147,406	$138,691	$ 91,040		$125,576
55–60	Count	180	212	216	257	141	114	25		1,145
	Avg. earnings	$107,039	$119,181	$129,148	$137,919	$148,211	$150,994	$151,334		$130,803
60–65	Count	87	151	142	151	86	133	82	30	862
	Avg. earnings	$113,206	$126,095	$136,792	$141,231	$146,555	$152,298	$153,677	$147,019	$138,644
>=65	Count	26	36	43	46	23	39	49	40	302
	Avg. earnings	$123,818	$132,476	$134,099	$141,701	$ *	$ *	$155,923	$158,333	$144,295
Total Count		**2,661**	**1,912**	**1,371**	**1,063**	**382**	**313**	**158**	**70**	**7,930**
Average Capped Earnings		**$ 97,013**	**$111,739**	**$126,084**	**$139,234**	**-$146,364**	**$150,983**	**$153,210**	**$153,484**	**$117,375**

** Not shown for confidentiality reasons to comply with privacy legislation.*

Pre-1992 Active and Suspended Membership Distribution

The following table provides a detailed summary of the active and suspended membership who have pre-1992 service at the valuation date by years of pre-1992 credited service and by age group using expected average annualized 2017 earnings.

		Years of Pre-1992 Credited Service				
Age		**< 5**	**5–10**	**10–15**	**15–20**	**Total**
50–55	Count	29	1			30
	Avg. earnings	$ *	$ *			$ 166,545
55–60	Count	121	28			149
	Avg. earnings	$ 172,585	$ 180,954			$ 174,157
60–65	Count	141	85	27	3	256
	Avg. earnings	$ 167,931	$ 187,574	$ 172,005	$ 161,025	$ 174,802
>=65	Count	49	47	36	5	137
	Avg. earnings	$ *	$ *	$ 193,490	$ 217,694	$ 184,307
Total Count		**340**	**161**	**63**	**8**	**572**
Average Capped Earnings		**$ 170,375**	**$ 185,318**	**$ 184,282**	**$ 196,443**	**$ 176,477**

* *Not shown for confidentiality reasons to comply with privacy legislation.*

Pensioner/Survivor Membership Distribution

The distribution by pensioner age and pension partner age for the pensioners and survivors in receipt of monthly pension payments is as follows:

Age		Pension Partner Age						No Pension Partner	Total
		< 55	55–65	65–75	75–85	85–95	>=95		
< 55	Count							12	12
	Average Pension							$ 13,810	$ 13,810
	Average of J&S%**							7.52	
55–60	Count	36	130	15	1			80	262
	Average Pension	$ *	$ 28,122	$ 19,783	$ *			$ 25,804	$ 28,154
	Average of J&S%**	0.84	0.85	0.87	0.67			5.90	
60–65	Count	33	314	141	6	1		201	696
	Average Pension	$ 40,838	$ 35,260	$ 34,587	$ *	$ *		$ 32,639	$ 34,583
	Average of J&S%**	0.81	0.85	0.86	0.78	1.00		3.68	
65–70	Count	24	168	450	36	1		288	967
	Average Pension	$ *	$ 38,256	$ 43,267	$ 31,569	$ *		$ 37,379	$ 40,136
	Average of J&S%**	0.88	0.84	0.85	0.84	0.67		1.77	
70–75	Count	18	101	603	108	5		376	1,211
	Average Pension	$ 54,124	$ 50,065	$ 53,780	$ 43,178	$ 48,408		$ 44,520	$ 49,632
	Average of J&S%**	0.84	0.80	0.84	0.85	0.87		1.46	
75–80	Count	7	37	221	280	14		353	912
	Average Pension	$ 44,804	$ 45,887	$ 50,125	$ 52,849	$ 50,086		$ 45,653	$ 49,017
	Average of J&S%**	0.86	0.84	0.80	0.84	0.81		0.24	
80–85	Count	1	8	45	233	26		258	571
	Average Pension	$ *	$ *	$ 49,133	$ 52,972	$ 49,493		$ 43,111	$ 48,059
	Average of J&S%**	1.00	0.71	0.82	0.86	0.85		0.02	
85–90	Count		3	4	73	80	4	188	352
	Average Pension		$ 32,173	$ 51,868	$ 47,694	$ 44,797	$ 60,432	$ 42,238	$ 44,181
	Average of J&S%**		0.78	0.84	0.86	0.93	0.92	0.00	
90–95	Count		1	3	7	41	5	94	151
	Average Pension		$ *	$ 44,903	$ *	$ 48,283	$ 56,238	$ 38,596	$ 42,444
	Average of J&S%**		0.67	0.78	0.86	0.90	0.83	0.00	
>=95	Count				1	5		30	36
	Average Pension				$ *	*		$ 30,943	$ 31,427
	Average of J&S%**				0.67	0.87		0.00	
Total	**Count**	**119**	**762**	**1,482**	**745**	**173**	**9**	**1,880**	**5,170**
	Average Pension	**$ 41,636**	**$ 37,372**	**$ 47,708**	**$ 49,740**	**$ 46,363**	**$ 58,102**	**$ 40,442**	**$ 43,668**
	Average of J&S%**	**0.84**	**0.84**	**0.84**	**0.85**	**0.90**	**0.87**	**1.30**	

** Not shown for confidentiality reasons to comply with privacy legislation.*
*** J&S% for members with no pension partner is remaining guarantee period.*

Pre-1992 Pensioner/Survivor Membership Distribution

The distribution by pensioner age and pension partner age for the pensioners and survivors in receipt of monthly pre-1992 pension payments is as follows:

Age		Pension Partner Age						No Pension Partner	Total
		< 50	50–60	60–70	70–80	80–90	>=90		
< 55	Count							2	2
	Average Pension							$ 19,097	$ 19,097
	Average of J&S%**							0.00	
55–60	Count	5	24	11				24	64
	Average Pension	$ 8,999	$ 11,478	$ 11,140				$ 15,110	$ 12,588
	Average of J&S%**	0.80	0.84	0.85				3.96	
60–65	Count	5	44	124	17			83	273
	Average Pension	$ 12,834	$ 17,364	$ 17,547	$ 16,558			$ 17,960	$ 17,495
	Average of J&S%**	1.00	0.81	0.84	0.77			2.42	
65–70	Count	6	24	258	92	3		179	562
	Average Pension	$ 24,347	$ 24,899	$ 26,818	$ 25,820	$ 34,179		$ 23,965	$ 25,677
	Average of J&S%**	0.95	0.85	0.85	0.81	0.67		1.43	
70–75	Count	4	31	206	378	12	1	281	913
	Average Pension	$ *	$ 28,629	$ 35,233	$ 38,677	$ 34,485	$ *	$ 33,333	$ 35,782
	Average of J&S%**	0.84	0.84	0.83	0.83	0.89	0.67	1.17	
75–80	Count	2	11	81	368	49	2	327	840
	Average Pension	$ 41,165	$ 33,356	$ 33,113	$ 41,882	$ 42,846	$ 48,435	$ 38,104	$ 39,524
	Average of J&S%**	0.84	0.91	0.80	0.82	0.84	0.84	0.20	
80–85	Count	1	2	16	152	135	3	256	565
	Average Pension	$ *	$ 31,056	$ 43,830	$ 44,260	$ 47,377	$ *	$ 39,532	$ 42,915
	Average of J&S%**	1.00	0.84	0.73	0.84	0.87	0.78	0.02	
85–90	Count			2	24	113	22	186	347
	Average Pension			$ 40,296	$ 42,248	$ 44,399	$ 51,170	$ 41,787	$ 43,256
	Average of J&S%**			0.84	0.86	0.90	0.93	0.00	
90–95	Count			2	3	26	26	94	151
	Average Pension			$ 37,149	$ 41,298	$ 52,520	$ 47,065	$ 38,633	$ 42,510
	Average of J&S%**			0.67	0.78	0.89	0.90	0.00	
>=95	Count					3	3	30	36
	Average Pension					$ 38,407	$ 29,979	$ 30,566	$ 31,170
	Average of J&S%**					0.89	0.78	0.00	
Total	**Count**	**23**	**136**	**700**	**1,034**	**341**	**57**	**1,462**	**3,753**
	Average Pension	**$ 21,119**	**$ 21,717**	**$ 28,591**	**$ 39,221**	**$ 45,483**	**$ 48,269**	**$ 34,507**	**$ 35,363**
	Average of J&S%**	**0.90**	**0.84**	**0.83**	**0.83**	**0.87**	**0.89**	**0.65**	

** Not shown for confidentiality reasons to comply with privacy legislation.*
*** J&S% for members with no pension partner is remaining guarantee period.*

Deferred Vested Membership Distribution

Annual pension amounts shown for deferred vested members are the amounts payable without adjustment for early or postponed retirement, but include cost of living adjustments granted up to January 1, 2017.

Age			
<=30	Count		13
	Average pre-92 pension	$	0
	Average total pension	$	1,796
30–35	Count		72
	Average pre-92 pension	$	0
	Average total pension	$	2,619
35–40	Count		191
	Average pre-92 pension	$	0
	Average total pension	$	4,325
40–45	Count		291
	Average pre-92 pension	$	0
	Average total pension	$	6,654
45–50	Count		348
	Average pre-92 pension	$	0
	Average total pension	$	7,594
50–55	Count		370
	Average pre-92 pension	$	98
	Average total pension	$	10,863
55–60	Count		234
	Average pre-92 pension	$	376
	Average total pension	$	10,248
60–65	Count		142
	Average pre-92 pension	$	2,313
	Average total pension	$	10,502
65–70	Count		22
	Average pre-92 pension	$	7,222
	Average total pension	$	19,570
>=70	Count		6
	Average pre-92 pension	$	3,062
	Average total pension	$	5,711
Total	**Count**		**1,689**
	Average pre-92 pension	**$**	**373**
	Average total pension	**$**	**8,283**

Appendix D: Going Concern Assumptions and Methods

Assumptions and Methods

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

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

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

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

	December 31, 2016	December 31, 2014
Economic Assumptions		
Discount rate	5.60% per annum	5.95% per annum
Inflation rate	2.25% per annum	Same
Increases in pensionable earnings	1.5% for two years and 2.75% thereafter, plus merit and promotion scale	1.0% for two years and 2.75% thereafter, plus merit and promotion scale
Increases in maximum pension limit	In accordance with *ITA*, then 2.75% per annum	Same
Interest on member contributions	2.75% per annum	3.0% per annum
Investment expenses	0.40% of assets (taken into account in the discount rate assumption)	0.30% of assets (taken into account in the discount rate assumption)
Non-investment expenses	0.06% of assets (taken into account in the discount rate assumption)	0.08% of assets (taken into account in the discount rate assumption)
Margin for adverse deviation	0.35% reduction to the discount rate assumption	0.42% reduction to the discount rate assumption
Demographic Assumptions		
Mortality table	85% (100% for females) of 2014 Canadian Pensioner Mortality Table ("CPM2014Publ85%") with generational improvements using CPM Scale B2D ("CPM-B")	Same
Retirement rates	Rates based on 2009 to 2014 experience (Table A following)	Same
Termination rates	Rates based on 2009 to 2014 experience (Table B following)	Same
Disability rates	None	Same
Merit and promotion	Rates based on 2009 to 2014 experience (Table C following)	Same
Proportion married		
Non-retired proportion with pension partner	80%	Same
Non-retired pension partner age differential	Males four years older	Same
Retired members	Actual marital status and ages are used	Same
Deferred pension take-up	60%	Same

	December 31, 2016	December 31, 2014
Settlement assumptions for commuted value transfers on termination	3.5% per annum discount 2.25% per annum inflation Mortality as above	4.25% per annum discount 2.25% per annum inflation Mortality as above
Headcount growth	0.75%	Same
Margin for adverse deviation	None	Same
Methods		
Actuarial cost method	Projected unit credit	Same
Asset valuation method	Market value of assets smoothed over three years	Same

Table A—Retirement Rates

Sample age and service based retirement rates are in accordance with the following table:

Age	0	5	10	15	20	23	>=26
55	10%	8%	4%	2%	2%	5%	20%
57	10%	7%	5%	5%	5%	6%	9%
59	10%	7%	5%	5%	3%	5%	9%
60	14%	8%	8%	8%	5%	6%	13%
61	11%	8%	5%	5%	9%	9%	10%
63	11%	16%	8%	10%	8%	8%	12%
64	18%	16%	18%	17%	14%	14%	12%
65	25%	25%	25%	25%	25%	25%	25%
67	20%	20%	20%	20%	20%	20%	20%
68	70%	70%	70%	70%	70%	70%	70%
69	100%	100%	100%	100%	100%	100%	100%

Deferred participants are assumed to retire at age 55 or six months following the valuation date, if older.

Table B—Termination Rates

Sample age and service rates for males and females used in this valuation are shown in the following table:

	Male		Female	
Age	Select Period (First 5 Years)	Ultimate Period (After 5 Years)	Select Period (First 5 Years)	Ultimate Period (After 5 Years)
<=24	25%	6.3%	25%	21%
25	24%	6.3%	24%	21%
30	10%	10%	16%	17%
35	10%	5%	11%	8%
40	10%	4%	10%	5%
45	9%	3%	11.5%	4%
50	9%	3%	11%	3.5%
55	0%	0%	0%	0%

Table C—Merit and Promotion Scale

Service-based merit and promotion rates are shown in the following table:

Service	Rates
<=14	3.0%
15-24	1.5%
>=25	1.0%

Justification of Actuarial Assumptions and Methods

Economic Assumptions

Discount Rate

We have used a discount rate of 5.60% per annum.

The overall expected return ("best-estimate") is 6.11% per annum, which is based on an inflation rate of 2.25% per annum, yielding a real rate of return on the pension fund assets of 3.86% per annum. This overall expected return was developed using best-estimate returns for each major asset class in which the pension fund is invested. A Monte Carlo simulation is performed over 30 years where the portfolio returns are projected assuming annual rebalancing. The average of the 30-year geometric return is used to develop an overall best-estimate rate of return for the entire pension fund. Gains from rebalancing and diversification are implicit to this return.

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

Development of Discount Rate

Overall expected return				6.11%
Non-investment expenses				(0.06)%
Investment expenses				
Passive	(1)	(0.10)%		
Actively managed	(2)	(0.30)%		
			(1)+(2)	(0.40)%
Additional returns due to active management				0.30%
Margin for adverse deviations				(0.35)%
Discount Rate				**5.60%**

Inflation Rate

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

Increases in Pensionable Earnings

To reflect anticipated short-term salary budgets, we have assumed pensionable earnings will increase at 1.5% per annum for two years from the valuation date and then increase at the rate of inflation plus 0.5% per annum for productivity growth. An allowance for seniority, merit and promotion ("SMP") has also been included in the salary increase assumption for all years (or 1.5% per annum plus SMP for two years and

2.75% per annum plus SMP thereafter). For the previous valuation, it was assumed that salaries would increase at 1.0% per annum for two years from the valuation date and then would increase at the rate of inflation plus 0.5% per annum for productivity growth, plus SMP (or 1.0% per annum plus SMP for two years and 2.75% per annum, plus SMP thereafter).

Total Payroll

In order to determine contribution rates for amortization of the unfunded liabilities as a percentage of earnings, it is necessary to make an assumption for the total payroll growth under the Plan. For this purpose, we have used the same increases for inflation and general wage increases as are used for individual member earnings. We have also included additional increases to average pensionable earnings of 0.5% per annum based on historical average increases under the UAPP from 2003 to 2017 in excess of Canadian average wage increases, and a provision for estimated headcount growth of 0.75% per annum. The assumption for the total payroll growth to be used for calculating the present value of pre-1992 additional contributions from January 1, 2017 to December 31, 2043 used the same increases as for the post-1991 amortization. The resulting salary increase rates that were used to determine contribution rates associated with unfunded liabilities of the plan are as follows:

- Pre-1992: 2.75% for two years, and 4.00% thereafter
- Post-1991: 2.75% for two years, and 4.00% thereafter

The construction of this assumption is similar to that used for the previous valuation.

The ultimate total payroll increase assumption for the previous valuation was 4.0% per annum.

Increases in the Maximum Pension Limit

Pensions are limited to the maximum limits under the *ITA*. The maximum lifetime annual pension per year of pensionable service payable under the *ITA* is $2,914.44 in 2017. It is assumed that the maximum limit will increase at 2.75% per year commencing in 2018. This is comprised of an annual increase of 2.25% on account of inflation, plus 0.5% on account of productivity, which is consistent with historical real economic growth. This assumption has not changed from the previous valuation.

Interest on Member Contributions

Interest is credited on member contributions with the rate credited by chartered banks on five-year personal fixed term deposits which we have assumed at a rate of 2.75% per year. The assumption reflects an assumed rate of future inflation plus 0.5% per year, which is consistent with historical rates. This assumption has changed from the previous valuation where interest on member contributions was assumed to be credited at 3.0% per annum.

Expenses

Investment expenses expected to be paid from the Plan in the future are assumed to be 40 basis points (10 basis points for passive and 30 basis points for active management) and are taken into account in the discount rate assumption. The Board believes that active management of the funds will recoup the active portion of the fees. We assumed 24 basis points at the previous valuation. Based on past plan experience, administrative expenses are assumed to be 0.06% of assets and this amount is included in the discount rate determination.

Economic Margins for Adverse Deviations

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

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

A margin for adverse deviations of 0.35% has been reflected in the interest rate assumption.

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

Demographic Assumptions

Mortality

During 2014, the CIA completed a study of Canadian pensioner mortality levels and trends. The 2014 study published mortality rates split by sector and included Public, Private and Combined tables, as well as possible pension size adjustment factors. A generational projection scale, CPM-B, was also developed to allow for improvements in mortality after 2014. The analysis undertaken during the last filed valuation continues to hold. Therefore, the continued use of the 2014 Canadian Pensioner Mortality Public Table ("CPM2014Publ"), with pension size adjustment factors of 85% for males and 100% for females, and with mortality improvements in accordance with CPM-B is considered reasonable.

Retirement

Retirement rates are typically developed taking into account the past experience of the Plan. Accordingly, the rates of retirement for active participants have been developed based on a review of plan experience for the years 2009 to 2014. These rates are considered best-estimate rates of retirement based on the plan provisions. These rates are unchanged from the previous valuation.

As in the previous valuation, all participants in receipt of disability benefits from an employer's approved long-term disability plan are assumed to continue to be disabled until termination or retirement. As such, they are included as active participants.

Based on Plan provisions which provide for an unreduced or subsidized early retirement reduction as early as age 55, deferred participants are assumed to retire at age 55 or six months following the valuation date if already older than 55.

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 were developed based on a prior review of Plan experience from the years 2009 to 2014 and are considered to be best estimate. This assumption has not changed from the previous valuation.

Option Elections on Termination

We have assumed that 60% of members will elect a deferred annuity, and 40% will elect a commuted value transfer or cash on termination. This assumption has not changed from the previous valuation. This assumption is based on an estimate of Plan experience and is considered best estimate.

In recognition of the lower prevailing discount rates and to determine commuted values, we have employed a different discount rate basis used to calculate termination benefits for those electing a deferred annuity versus those that elect a lump-sum transfer value. The discount rate applied for those assumed to elect a commuted value transfer is 3.50% per annum and the inflation rate used is 2.25% per annum. This assumption has changed from the previous valuation where the commuted value discount rate used was 4.25% per annum.

Disability

As in the previous valuation, the probability of future disability of current active members was assumed to be nil. Members who become disabled normally continue to accrue benefits with earnings at the pre-disability level, with general increases, so long as they are in receipt of long term disability benefits. Use of an actual disability assumption in this case would reduce liabilities slightly, so a nil disability incidence assumption represents a small element of conservatism. The disability assumption has very little impact on the valuation results.

Proportion of Members with Pension Partners and Pension Partner 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 pension partner. The proportion of members who will have a pension partner and the pension partner age difference was based on broad population statistics.

For retired members, the actual marital status and pension partner age are used.

As with the previous valuation, we assumed that 80% of participants would have a pension partner at the relevant time. All pension partners are assumed to be the opposite gender of the participant. Male partners were assumed to be four years older than their female partners based on an analysis of recent retirements. The remaining 20% of participants were assumed to have no pension partner. While the definition of pension partner includes same-sex relationships, this assumption adequately provides for all such contingencies.

The pension partner age difference assumption has very little impact on the valuation results.

Seniority Merit and Promotion (SMP)

As described under “Increases in Pensionable Earnings”, we have included a SMP scale in addition to inflation and productivity growth. The SMP rates (Table C) were developed based on Plan member earnings for the years 2009 to 2014 and are considered to be best estimate. This assumption has not changed from the previous valuation.

Demographic Margins for Adverse Deviations

All demographic assumptions are considered best estimate so no margins for conservatism or provisions for adverse deviation have been built into the going concern demographic assumptions.

Other

Actuarial Cost Method

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

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

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

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

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

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

Asset Valuation Method

The actuarial value of assets is a smoothed market value and is calculated as the average of the market value of invested assets at the valuation date and the two market values from preceding calendar year-ends accumulated to the valuation date. The accumulated market values at the end of each year equal the sum of:

- the appropriate (accumulated or actual) market value at the beginning of the year;
- the net contributions during the year (calculated as contributions less benefit payments plus net transfers); and
- the assumed investment return (determined as the going-concern liability discount rate applicable to the most recent funding valuation prior to the particular year).

To ensure that the asset valuation method develops an asset value that appropriately tracks market value over time, the calculated actuarial value of assets is adjusted, if necessary, so that it falls within 10% of the market value of assets (“10% corridor”).

This asset valuation method is unchanged from the previous valuation.

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. Appendix C of the report deals with data omissions so they will not be repeated here.

- It is administrative practice for the Plan that indexation of deferred and immediate pensions commences January 1 of the year following termination or retirement;
- Normal cost contributions are based on pensionable earnings below the maximum earnings limit described earlier in this report;
- The pensionable earnings for calculating normal cost percentage is nil for participants with 35 years of combined pensionable service;
- For deferred benefits on termination (post-1991 service), the pensions were deferred to 55 with the early reduction factor calculated from the earlier of age 60 and the attainment of 80 points. Deferred vested members over age 55 at the valuation date were assumed to retire six months following the valuation date.

Appendix E: Solvency Assumptions and Methods

Valuation Assumptions

	December 31, 2016	December 31, 2014
Economic Assumptions		
Discount Rate		
Transfer value basis		
—*Without indexation*		
Active and deferred members not retirement eligible	2.2% per annum for 10 years; 3.5% per annum thereafter	2.5% per annum for 10 years; 3.8% per annum thereafter
Annuity purchase basis		
—*Without indexation*		
Retirement eligible active and deferred members and all retired members, survivors and beneficiaries	3.1% per annum	2.6% per annum
Transfer value basis		
—*With indexation*		
Active and deferred members not retirement eligible	1.5% per annum for 10 years; 2.2% per annum thereafter	1.8% per annum for 10 years; 2.5% per annum thereafter
Annuity purchase basis		
—*With indexation*		
Retirement eligible active and deferred members and all retired members, survivors and beneficiaries	1.2% per year	0.7% per year

	December 31, 2016	December 31, 2014
Demographic Assumptions		
Mortality table		
Annuity purchase basis	100% of 2014 Canadian Pensioner Mortality Table ("CPM2014") with generational improvements using scale CPM-B	100% of 1994 Uninsured Pensioner ("UP94") Mortality Table with generational improvements using Scale AA
Transfer value basis	CPM2014Publ85% with generational improvements using scale CPM-B	92% of 1994 Uninsured Pensioner ("UP94") Mortality Table with generational improvements using Scale BB
Termination rates	Not applicable	Same
Retirement age		
Active and deferred vested members	100% immediate retirement if at least age 55 at employment termination; otherwise 100% at age 55	Same
Retired members and beneficiaries	Not applicable	Same
Termination of employment	Terminate with full vesting	Same
Marital status		
Non-retired pension partner proportion	80%	Same
Non-retired pension partner age differential	Males four years older	Same
Retired members	Actual marital status and ages are used	Same
Other		
Wind up expenses	$2,900,000	$2,700,000
Actuarial cost method	Unit credit	Same
Asset valuation method	Market value of assets adjusted to reflect contributions, benefit payments, transfers and fees/expenses in transit as of the valuation date	Same
Solvency Incremental Normal Cost		
The assumptions for the expected benefit payments and decrement probabilities, service accruals, and projected changes in benefits and/or pensionable earnings	Same as going concern	Same
New entrants	Full replacement for decrementing members	Same

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

	Percent of Liability Assumed to be Settled By Purchase of Annuities	Percent of Liability Assumed to be Settled By Lump-Sum Transfer
Active members		
Not retirement eligible	40%	60%
Retirement eligible	100%	0%
Deferred vested members		
Not retirement eligible	40%	60%
Retirement eligible	100%	0%
Retired members and beneficiaries	100%	0%

Benefits Valued

	Solvency Valuation
Vesting	We have treated all accrued benefits as vested on Plan wind up.
Post-valuation date benefit increases	Benefits are based on the average earnings and service at the valuation date.
Indexing	According to Plan provisions, the benefits to which a member would be entitled if the Plan was terminated on the valuation date would include pension indexing of 60% of Alberta CPI. This indexing rate has been accounted for in the With Indexation discount rates summarized earlier in this Section.

Justification for Valuation Assumptions

Solvency lump-sum discount rate for 10 years (Non-indexed)	= V122542[1] + 90 bps = 1.27% + 0.90% **= 2.17% (rounded to 2.20%) per annum**
Solvency lump-sum discount rate for 10 years (Fully indexed)	= V122542[1] x (V122553[1] / V122544[1]) + 90 bps = 1.27 x (0.35 / 2.17) + 0.90% **= 1.11% (rounded to 1.10%) per annum**
Solvency lump-sum discount rate thereafter (Non-indexed)	= V122544[1] + 0.5 x (V122544[1] – V122542[1]) + 90 bps = 2.17% + 0.5 x (2.17% – 1.27%) + 0.90% **= 3.52% (rounded to 3.50%) per annum**
Solvency lump-sum discount rate thereafter (Fully indexed)	= V122553[1] + 0.5 x [V122553[1] – (V122542[1] x (V122553[1] / V122544[1]))] + 90 bps = 0.35 + 0.5 x [0.35 – (1.27 x (0.35 / 2.17))] + 0.90 **= 1.32% (rounded to 1.30%) per annum**
Solvency annuity purchase discount rate (Non-indexed)	= V39062 + Duration Adjustment = 2.21% + 0.92% **= 3.13% per annum**
Solvency annuity purchase discount rate (Fully indexed)	= V39057 – Fully Indexed Proxy = 0.51% – 0.60% **= -0.09% per annum**
Solvency annuity purchase discount rate (60% indexed)	= (0.6 x Fully indexed solvency annuity purchase discount rate) + ((1 – 0.6) x Non-indexed solvency annuity purchase discount rate) = (0.6 x -0.09%) + ((1 – 0.6) x 3.13%) **= 1.20% per annum**

The indexed rates currently used in the valuation were derived by applying 60% of the CPI to the fully indexed rates.

The CIA's Guidance indicates that the cost of purchasing non-indexed annuities would be estimated based on the duration of the liabilities expected to be settled through annuity purchase. The duration of this Plan was estimated to be 11.44 and the resulting duration adjustment to the unadjusted CANSIM series V39062 interest rate is 0.92%.

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

[1] CANSIM Series (annualized)

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

For benefit entitlements that are expected to be settled by lump-sum transfer, we based the assumptions on the Canadian Institute of Actuaries Standards of Practice for Pension Commuted Values, effective October 1, 2015, using rates corresponding to a valuation date of December 31, 2016.

Pensionable Earnings

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

Preretirement Mortality

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

Mortality Rates

For benefits that are settled by way of annuity purchase, mortality is assumed to be in accordance with the sex distinct rates of the 2014 Canadian Pensioner Mortality Table ("CPM2014") with generational improvements using CPM Scale B2D ("CPM-B"). This mortality assumption is representative of the mortality table that, together with the discount rate assumption of 1.2%, approximates annuity purchase rates at the valuation date, in accordance with guidance provided by the Canadian Institute of Actuaries for solvency valuations as at the valuation date. This assumption has changed from the previous valuation where the 1994 Uninsured Pensioner ("UP94") Mortality Table with generational improvements using Scale AA was used.

For benefits that are settled by way of lump sum transfer, mortality is assumed to be in accordance with the sex distinct rates generated from the 2014 Canadian Pensioner Mortality Public Table ("CPM2014Publ"), with pension size adjustment factors of 85% for males and 100% for females, and with mortality improvements in accordance with CPM-B. This is the table used by the Board to calculate lump sum transfer values in accordance with accepted actuarial practice as at the valuation date. This assumption has changed from the previous valuation where 92% of the 1994 Uninsured Pensioner ("UP94") Mortality Table with generational improvements using Scale BB was used.

Termination Rates

All participants who are actively employed on the valuation date are assumed to terminate their employment on this date and subsequently retire from the Plan in accordance with the retirement age assumption summarized below.

Retirement Rates

All participants age 55 or older who are actively employed on the valuation date are assumed to retire immediately and receive a pension in accordance with the terms of the Plan and the member's age and continuous service. All other Plan members are assumed to retire at age 55.

Assumptions Not Needed

The following are not relevant to the solvency valuation:

- Increases in pensionable earnings;
- Increases in Year's Maximum Pensionable Earnings;
- Increases in *ITA* maximum pension limit (we used the 2017 maximum); and
- Disability rates.

Estimated Wind Up Expenses

Plan wind up expenses would normally include such items as fees related to preparation of the actuarial wind up report, fees imposed by a pension supervisory authority, legal fees, administration, custodial and investment management expenses. We have assumed these fees would be $2,900,000. This assumption has changed from the previous valuation where fees were assumed to be $2,700,000.

Calculation of Special Solvency Payments

Pursuant to the *Employment Pension Plans Regulation* Amendment 245/2003, the Plan is exempt from making solvency deficiency payments, with effect from January 1, 2003 so it is not necessary to calculate solvency special payments.

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 with adjustments for:

- In-transit items at the valuation date; and
- Expenses for Plan termination as outlined above.

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 PPFRC 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

- Projected 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 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, service accruals, and projected changes in benefits and/or pensionable earnings would be consistent with the assumptions used in the pension plan's going concern valuation.

- The assumptions used to calculate the projected liability at time t are consistent with the assumptions for the 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 are considered in calculating the incremental cost.

Appendix F: Summary of Plan Provisions

This funding valuation was based on Plan design information provided by the Board as of December 31, 2016. The following is a summary of the main provisions of the Plan.

Effective Date

Effective January 1, 2001 the Universities Academic Pension Plan became a non-statutory pension plan subject to and registered under the *Employment Pension Plans Act* of Alberta. Prior to January 1, 2001 the plan was governed by the Alberta *Public Sector Pension Plans Act* and the *Universities Academic Pension Plans Act* (before 1993). The Plan is also registered under the *ITA*. The Plan now operates under a Sponsorship and Trust Agreement signed by the Plan Sponsors. A complete description of the Plan can be found in the Sponsorship and Trust Agreement, and a summary of Plan provisions relevant to the valuation and extrapolation is included in this Appendix.

Jurisdiction of Registration

Alberta.

Eligibility for Membership

Open to full- and part-time employees who meet the criteria specified in the Plan.

Vesting

Vesting of benefits for all service is as follows:

- Members who terminate before January 1, 2001 are vested with five years of pensionable service.
- Members who terminate on or after January 1, 2001 and before September 1, 2014 are vested with at least two years of Continuous Plan Membership.
- Members who terminate on or after September 1, 2014 are immediately vested.

Normal Retirement

Eligibility

Normal retirement date is the June 30th following the member's 65th birthday.

Benefit

Annual pension payable in equal monthly installments calculated as the sum of the following:

a) for each year of pensionable service prior

to January 1, 1992, 2.0% of the member's highest average salary; plus

b) for each year of pensionable service in 1992 and 1993, 2.0% of the member's highest average capped salary; plus

c) for each year of pensionable service after December 31, 1993, 1.4% of the lesser of the highest average capped salary and the average YMPE plus 2.0% of the excess of the highest average capped salary over the average YMPE, if any, plus a bridge benefit of 0.6% of the lesser of the highest average capped salary and the average YMPE, payable to age 65.

Highest average pensionable salary is the participant's average annual salary in the five consecutive years of pensionable service in which such average is the highest, and the average YMPE is the average of the Year's Maximum Pensionable Earnings under the Canada Pension Plan in the years used to determine the member's highest average pensionable salary.

Early Retirement

From active service

Eligibility

Age 55 with full vesting.

Benefit

For service after December 31, 1993, if a member commences pension payments prior to the normal retirement date, then the pension payable to the member will be equal to the normal retirement pension, reduced by an early retirement factor as described below.

The early retirement factor is 3.0% for each year by which the member's retirement date precedes the earliest of:

a) age 60; and
b) the day on which the member would have completed 80 points of age plus pensionable service (with no service after the date of termination).

If a member is vested and retires after attaining age 60 or 80 points as described above, no reduction is applied.

In addition, a member who retires before the normal retirement date will receive a bridge benefit for each year of pensionable service after December 31, 1993 equal to 0.6% of the lesser of the highest average capped salary and the average YMPE, reduced by the early retirement factor described above, and payable to age 65.

For service prior to January 1, 1994 the early retirement pension is equal to the unreduced normal retirement pension.

Postponed Retirement

Eligibility: Any time after normal retirement date and before December 31 of the year in which the member attains age 69. A member who terminates or retires prior to age 69 may defer pension commencement.

Benefit: Normal retirement benefit accrued to postponed retirement date. When pension commencement is deferred past a member's date of termination, the pension with respect to pre-1994 service is actuarially increased for commencement after age 55 (actuarial increase for commencement after age 65 for post-1993 service).

Termination of Employment

Pre-1994 service

Eligibility: Members are fully vested.

Benefit:

a) the member will receive a deferred pension, or
b) a refund or transfer of the commuted value of the member's accrued pension plus excess contributions, or
c) a refund or transfer of the member's and employer's contributions with interest.

Post-1993 service

Eligibility: Members are fully vested.

Benefit:

a) the member will receive a deferred pension, or
b) a transfer of the commuted value of the member's accrued pension plus excess contributions, or
c) a transfer of 175% of the member's contributions with interest.

Pre-retirement Death

Pre-1994 service

Eligibility	Members are fully vested upon death.
Benefit	No pension partner: The beneficiary or estate will receive the commuted value of the member's accrued pension plus excess contributions or the member's and employer's contributions with interest. Pension partner: The pension partner will receive a lifetime survivor pension as if the member had retired on the day before death and elected a joint and survivor 100% pension, or a refund of the member's and employer's contributions with interest.

Post-1993 service

Eligibility	Members are fully vested.
Benefit	No pension partner: The beneficiary or estate will receive the commuted value of the member's accrued pension plus excess contributions or 175% of the member's contributions with interest. Pension partner: The pension partner will receive a lifetime survivor pension as if the member had retired on the day before death and elected a joint and survivor 100% pension plus excess contributions, or – a transfer of the commuted value of the member's accrued pension plus excess contributions, or – a transfer of 175% of the member's contributions with interest.

Post-retirement Death

Pre-1994 service

Benefit	The normal form of pension is payable for life and guaranteed for 15 years in any event.

Post-1993 service

Benefit	If the member has a pension partner at retirement, the normal form of pension provides a survivor benefit equal to 2/3 of the member's accrued pension would be paid, had the member continued

	to live. The normal form of pension for a member without a pension partner at retirement is payable for life and guaranteed for ten years in any event. A different form of pension may be elected at retirement in an actuarially equivalent amount.
Disability	
Eligibility	Qualification for benefits under employer-sponsored long-term disability plan.
Benefit	For members who are receiving benefits under the LTD plan, participation in the Plan continues, but no pension is payable concurrently with the benefit paid under the LTD plan. For members who are not receiving benefits under the LTD plan, are permanently and totally disabled, and vested, they are entitled to receive an immediate unreduced pension based on pensionable service and salary to the date of the disability. If the member is partially disabled, the pension is reduced in accordance with the Plan. Earnings during disability are deemed to be at the same level as in effect just prior to disability, with subsequent wage increases applicable for that member's class.
Contributions	Members and employers contribute the entire cost of the benefits accruing for future benefits as well as the amortization of deficiencies related to post-1991 service in accordance with the *EPPA*. An agreement is in place whereby the Government of Alberta contributes 1.25% of total payroll towards the pre-1992 unfunded liability until the pre-1992 unfunded liability is eliminated, or December 31, 2043 if earlier. The members and employers contribute the remaining amounts calculated as necessary to eliminate the unfunded liability by December 31, 2043.
Maximum Benefit	Effective January 1, 1992, and only in respect of pensionable service after 1991, pensionable earnings for service in 1992 and 1993 are limited to 50 times the defined benefit annual maximum pension limit for the year under the *ITA.* Pensionable earnings for post 1993 service are limited to 50 times the defined benefit annual

maximum pension limit plus 0.6% of the YMPE for the year under the *ITA.*

For years after 2006, the limit is as follows:

Year	Limit 1992-1993 Svc	Limit Post-93 Svc
2007	111,111	124,221
2008	116,667	130,137
2009	122,222	136,112
2010	124,722	138,882
2011	127,611	142,101
2012	132,334	147,364
2013	134,834	150,164
2014	138,500	154,250
2015	140,945	157,025
2016	144,500	160,970
2017	145,722	162,312
2018+	Indexed to Average Industrial Wage	Indexed to Average Industrial Wage

Cost-of-Living Increases

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

Definitions

Pensionable earnings

The participant's actual salary limited to the amount in any year after 1992 which results in the maximum defined benefit for that year under the *ITA Regulations*.

Credited interest

Prior to 1994, participants' contributions were accumulated at the rate of 4% per annum, compounded semi-annually. After 1993, the rate of interest credited to participants' contributions was changed to the average yield of 5-year personal fixed term chartered bank deposits (CANSIM series V122515) over the most recent 12-month period, calculated as of the first day of the calendar year.

Pensionable service

Combined pensionable service, as defined under the provisions of the Plan, cannot exceed 35 years. Combined pensionable service (service in the Plan plus pensionable service in the Public Service Pension Plan) is used to determine eligibility for benefits, vesting and determination of highest average salary.

A copy of a letter from the Board certifying the accuracy and completeness of the plan provisions summarized in this report is included in Appendix G of this report.

Appendix G: Administrator Certification

With respect to the Universities Academic Pension Plan, forming part of the actuarial report as at December 31, 2016, I hereby certify that, to the best of my knowledge and belief:

- The asset data provided or made available to the actuary is complete and accurate;
- The membership data and subsequent query answers provided or made available to the actuary are complete and accurate for all persons who are entitled to benefits under the terms of the plan in respect of service up to the date of the valuation;
- The summary of the Plan provisions contained in Appendix F is an accurate summary of the Plan provisions; and
- The actuary has been notified of all relevant events subsequent to the valuation measurement date.

Chris Schafer

Name (print) of Authorized Signatory

Director, Finance and Administration

Title

Signature

23 November 2017

Date

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