



UNIVERSITY OF WATERLOO

June 21, 2017

Broader Public Sector Pensions Policy Branch
Ministry of Finance
1st Floor, Frost Building South
7 Queen's Park Crescent
Toronto ON M7A 1Y7

**RE: UNIVERSITY OF WATERLOO PENSION PLAN FOR FACULTY AND STAFF;
REGISTRATION NUMBER 0310565**

Dear Sir/Madam:

This application by the University of Waterloo is for Stage 2 solvency funding relief for the University of Waterloo Pension Plan for Faculty and Staff (the "Plan") under Ontario Regulation 178/11 under the *Pension Benefits Act*.

The Stage 1 Valuation Date for the Plan was as at January 1, 2014. The Stage 2 Valuation Date for the Plan is as at January 1, 2017.

Background on Plans

The Plan is a contributory defined benefit pension plan covering all employees at the University and its federated university and affiliated university colleges. A brief summary of the benefit provisions of the Plan is provided in Appendix A to this application.

A summary of the actuarial assumptions used in the January 1, 2014 and January 1, 2017 actuarial valuations is provided in Appendix B to this application.

The members of the Plan include faculty represented by the Faculty Association, staff represented by the Staff Association and employees for whom CUPE Local 793 is the collective bargaining agent. However, the Plan is not subject to bargaining.

The University through its Board of Governors (the "Board") is the administrator of the Plan. The Board has delegated the responsibility for and control of the administration of the Plan to the Pension & Benefits Committee (the "Committee"). The Committee is a standing committee of the Board.

Summary of Application

The Savings Targets included in the application approved for Stage 1 for the Plan was 10.3%. The changes made to the Plan that have been included in the savings target calculation achieved a savings under the specified calculation methodology of 20.3%. Therefore, the Plan has met the Savings Target test to be admitted to Stage 2.

Between January 1, 2014 and December 31, 2016, the University made annual going concern special payments of \$14,985,700 to the Plan to meet the minimum special payment requirements under Stage 1 rules. In addition, the University has remitted additional special funding of \$3,363,600 in order to improve the funded status of the Plan. Effective with the January 1, 2017 actuarial valuation, the annual special payments are outlined in the table below. The going concern special payment is effective January 1, 2017. The solvency special payment will start January 1, 2018 as the University intends to elect to defer the start of any solvency special payment by 12 months.

Starting January 1, 2018	Going Concern	Solvency	Total
Without Stage 2 Solvency Funding Relief	\$ 12,562,600	\$ 34,621,300	\$ 47,183,900 (for 5 years)
With Stage 2 Solvency Funding Relief:			
▪ 10-year amortization	\$ 12,562,600	\$ 12,712,600	\$ 25,275,200
With Stage 2 Solvency Funding Relief:			
▪ 3-year deferral period	\$ 12,562,600	\$ 0	\$ 12,562,600 (for 3 years)
▪ 7-year amortization after deferral period	\$ 12,562,600	\$ 18,989,500	\$ 31,552,100 (for 7 years starting January 1, 2021)

Going Concern Valuation Results as of January 1, 2014 and January 1, 2017

The going concern valuation results as of January 1, 2014 and January 1, 2017 for the Plan are summarized below. More details, including the actuarial assumptions and methods used for the valuation, membership and asset data, and plan provisions can be found in the actuarial report as at January 1, 2014 and the Appendices of this application.

	As of January 1, 2014 (000's)	As of January 1, 2017 (000's)
Past Service		
Actuarial Value of Assets	\$ 1,156,065 ¹	\$ 1,474,594 ²
Less: Accrued Liability	<u>1,305,570</u>	<u>1,585,568</u>
Surplus/(Unfunded Accrued Liability)	\$ (149,505)	\$ (110,974)
Market Value of Assets	\$ 1,194,776	\$ 1,518,959
Current Service		
Total Current Service Cost	\$ 53,202	\$ 67,245
Less: Required Participant Contributions	<u>25,987</u>	<u>31,235</u>
University Current Service Cost	\$ 27,215	\$ 36,010
As a % of Required Member Contributions	104.7%	115.3%
As a % of Pensionable Earnings	7.66%	8.51%
Pensionable Earnings	\$ 355,352	\$ 423,325

Solvency Valuation Results as of January 1, 2014 and January 1, 2017

The solvency valuation results as of January 1, 2014 and January 1, 2017 for the Plan are summarized below. More details, including the actuarial assumptions and methods used for the solvency valuation, membership and asset data, and plan provisions, can be found in the actuarial report as at January 1, 2014 and the Appendices of this application.

	As of January 1, 2014 (000's)	As of January 1, 2017 (000's)
Solvency Assets ³	\$ 1,194,276	\$ 1,518,459
Less: Solvency Liability	<u>1,270,651</u>	<u>1,744,213</u>
Solvency Excess/(Deficit)	\$ (76,375)	\$ (225,754)
Solvency Ratio	0.94	0.87

¹ Market value for all assets except for real return bonds which are valued as cash flows discounted at valuation rate (3.75% real)

² Market value of assets less funding reserve from sale of real return bonds

³ Net of provision of \$500,000 for estimated wind-up expense

Going Concern Special Payments as at January 1, 2017

The Unfunded Accrued Liability is \$110,974,000 as at January 1, 2017. The amortization of the Unfunded Accrued Liability generates annual special payments of \$12,562,600. The present value of these payments is shown for solvency valuation purposes. The 6-year present value amount does not reflect Stage 2 solvency relief. The 11-year present value reflects Stage 2 solvency relief.

Nature of Deficiency	Effective Date	Revised End Date	Annual Special Payment	Present Value as of January 1, 2017	
				For Going Concern Valuation ¹	For Solvency Valuation ²
Going Concern	January 1, 2014	December 31, 2028	\$ 12,562,600	\$ 110,974,000	\$ 69,183,000 (6 years)
					\$ 118,428,900 (11 Years)

¹ The values in the table were developed using the going concern interest rate of 5.50% per year compounded monthly in arrears.

² The values in the table were developed using the weighted average solvency interest rate of 2.9% per year, compounded monthly in arrears. For the present value of the going concern special payments, a maximum of six years' of such payments were considered in the calculation; except for streams established under Stage 2 solvency relief measures in which case, a maximum of 11 years of such payments were considered.

Minimum Special Payments for Plans Under Stage 2 of Solvency Funding Relief Measures as at January 1, 2017

Amended regulation 178/11 under the *Pension Benefits Act* requires the Plan provide for the University to make special payments to liquidate any solvency deficiency determined in the Stage 2 Valuation Report according to the following rules:

Rule 1 – Amortize the solvency deficiency identified in the Stage 2 Valuation Report over a period of 10 years; and make such monthly special payments for three years starting no later than 12 months after the Stage 2 Valuation Date

Rule 2 – The minimum monthly special payments during that three-year period is the greater of zero and (i) minus (ii) where (i) and (ii) are defined as follows:

- i. Interest on solvency deficiency (without regards to estimated wind-up expenses), payable on a monthly basis,
- ii. The monthly special payments to liquidate the going concern unfunded liability.

Rule 3 – During the remaining seven year period, special payments must be made to liquidate the solvency deficiency as at January 1, 2017

Rule 1 will result in a solvency deficiency payment of \$12,712,600 starting January 1, 2018.

Rule 2 will result in a solvency payment of \$0 determined as follows:

Greater of \$0 and:

- i. Interest on the solvency deficiency (without regards to estimated wind-up expenses) of \$6,532,400 ($\$225,254,000 \times 2.9\%^1$) minus
- ii. The special payments of \$12,562,600 to liquidate the Unfunded Accrued Liability

Rule 3 will result in a solvency deficiency payment of \$18,989,500 starting January 1, 2021.

¹ Liability-weighted average of interest rates used for solvency valuation

Savings Target as at January 1, 2014 Under Stage 1 of Solvency Funding Relief Measures

As established under the Solvency Funding Relief application for Stage 1, the Savings Target was calculated as follows.

Valuation Date	Going Concern Funded Ratio	Solvency Funded Ratio
	Market Value of Assets/ Going Concern Liabilities	Market Value of Assets/ Solvency Liabilities
January 1, 2012 (proxy for January 1, 2014)	0.846	0.823
January 1, 2011	0.888	0.963
January 1, 2010	0.853	0.937
January 1, 2008	1.017 (capped at 1.00)	1.142 (capped at 1.00)
Average	0.897	0.931

$$\begin{aligned}
 \text{Savings Target} &= 1 - (\text{lesser of } 0.897 \text{ and } 0.931) \\
 &= 1 - 0.897 \\
 &= 0.103 \text{ or } 10.3\%
 \end{aligned}$$

Plan Amendments

The Committee spends a considerable amount of time on the matter of Plan sustainability. This is reflected in the actions the Committee has taken in the past few years to address Plan sustainability, both in terms of member and University contribution levels and benefit changes. The changes made in the five year period prior to the Stage 1 valuation (between January 1, 2009 and January 1, 2014) are included in the measurement of the progress against the savings target and are summarized below.

Increase in Member Contribution Rates

Between January 1, 2009 and January 1, 2014, member contributions increased in two steps to the current rate of 6.25% up to the YMPE, 8.95% on pensionable earnings between the YMPE and two times the YMPE, and 9.95% of pensionable earnings in excess of two times the YMPE. This increase took place in two steps as shown below:

Effective Date	Contribution Rates on Salary:		
	Up to YMPE	Between YMPE and 2x YMPE	Above 2x YMPE (up to ITA maximum contribution)
July 1, 2008 (Baseline)	5.05%	7.85%	9.20%
May 1, 2009	5.80%	8.30%	9.65%
January 1, 2013	6.25%	8.95%	9.95%

Changes to Benefit Provisions

Between January 1, 2009 and January 1, 2014, the following benefit plan changes have been implemented:

Effective Date	Change In Provision
January 1, 2012	<ul style="list-style-type: none"> Interest credited on member contributions changed from 4-year average rate of return on pension fund to CANSIM five-year fixed-term deposit rate
January 1, 2014	<ul style="list-style-type: none"> Averaging period for final average earnings lengthened from 36 months to 60 months, transitioned over a two-year period Guaranteed indexation on pension benefits accrued on or after January 1, 2014 reduced from 100% to 75% of increase in CPI up to a maximum increase in CPI of 5% Elimination of commuted value option for retirement-eligible members

Sustainability Test Under Stage 2

In accordance with the requirements of the sustainability test under Stage 2 of Solvency Funding Relief, the tables below provide the savings achieved for the Plan, calculated as at January 1, 2017 and based on the actuarial assumptions and methods as at January 1, 2014, with and without plan amendments.

As at January 1, 2017	Before Plan Amendments (0) (000's)	After Plan Amendments (n) (000's)
Present Value of Benefits For Future Service (PVFB)	\$ 741,741	\$ 690,338
Portion From University Contributions (ER PVFNC)	\$ 445,796	\$ 345,487
Portion From Member Contributions (EE PVFNC)	\$ 295,945	\$ 344,851
Actuarial Liability (AL)	\$ 1,556,036	\$ 1,505,402
Savings Achieved	$= \frac{(ER\ PVFNC(0) - ERPVFNC(n)) + (AL(0) - AL(n))}{PVFB(0)}$ $= \frac{(\$445,796 - \$345,487) + (\$1,556,036 - \$1,505,402)}{\$741,741}$ $= 20.3\%$	

The changes to the Plan made from January 1, 2009 through January 1, 2014 have resulted in savings larger than the 10.3% Savings Target established in the Stage 1 solvency relief application.

Confirmation

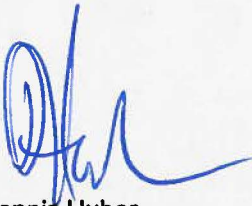
This application has been delivered to the bargaining agents representing members prior to its filing and has been posted for active members of the Plan on the University's website. The application will also be shared with retired members of the Plan.

Questions/Additional Information

Please direct questions or requests for additional information to my attention.

Thank you for your consideration. We look forward to your response to this application.

Yours truly,



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cc: Ms. Linda M. Byron, Aon Hewitt
Mr. Allan H. Shapira, Aon Hewitt

Appendix A - Plan Provisions

Effective Date

January 1, 2011 (last restatement of the Plan document).

Eligibility for Membership

Faculty and Staff Employees are eligible to join the Plan on the first day of any month coincident with or next following the date of employment with the University. An eligible Employee must join the Plan no later than the first day of the calendar year coincident with or next following attainment of age 35, or their appointment (if already age 35).

Faculty Employees employed as lecturers may elect not to join the Plan. However, a lecturer who has attained age 35 must join the Plan on the first day of the month coincident with or next following the earlier of promotion to a higher rank or completion of five years of service with the University.

Any Employee who has either earned at least 35% of the Year's Maximum Pensionable Earnings (YMPE) under the Canada Pension Plan or worked at least 700 hours in each of the two immediately preceding calendar years, shall be eligible to join the Plan on the first day of any month coincident with or next following the date on which such conditions are satisfied.

Plan Provisions (continued)

Normal Retirement

Eligibility

First day of the month coincident with or next following attainment of age 65.

Benefit

Effective May 1, 1998 on retirement, a member receives an annual pension equal to the sum of the following:

- 1.4% of Final Average Earnings up to the Average Year's Maximum Pensionable Earnings, plus,
- 2.0% of Final Average Earnings in excess of the Average Year's Maximum Pensionable Earnings.

for each year and completed month of Credited Service under the Plan.

The Final Average Earnings is determined based on 36 consecutive months of earnings for retirements on or before January 1, 2014. The averaging period is increased by one month for each month in 2014 and 2015 so that the averaging period is 60 consecutive months for all retirements after December 31, 2015. The Average Year's Maximum Pensionable Earnings is determined over a five-year period.

On retirement prior to May 1, 1998, a member received an annual pension equal to the sum of the following:

- 1.3% of Final Three-Year Average Earnings up to the Average Year's Maximum Pensionable Earnings, plus,
- 2.0% of Final Three-Year Average Earnings in excess of the Average Year's Maximum Pensionable Earnings.

for each year and completed month of Credited Service under the Plan.

The Average Year's Maximum Pensionable Earnings was determined over a three-year period.

Plan Provisions (continued)

Normal Retirement (continued) Benefit (continued)

Maximum Pension

The annual benefit payable in the Normal Form under the Plan for a member determined at the time of pension commencement cannot exceed the lesser of:

- the lesser of (a) and (b):
 - (a) the defined benefit limit for the year as defined in the *Income Tax Act*; and
 - (b) \$3,200.00
- times the Member's Credited Service; and
- 2.0% of the Member's highest indexed compensation times Credited Service.

For service prior to January 1, 1992, a member's Credited Service shall not exceed 35 years.

Regulation 8504(6) imposes a lower maximum benefit limit in respect of any pre-1990 service that is granted after June 8, 1990 (e.g., buy-back or granting of years of pre-1990 service that was not previously counted as Credited Service).

Plan Provisions (continued)

Early Retirement

Eligibility

Within ten years of normal retirement date.

Benefit

For Members who retired on an early retirement date prior to May 1, 2000, the pension payable on early retirement is reduced by $\frac{1}{3}$ of 1% for each of the first 60 complete months by which early retirement precedes the normal retirement date plus $\frac{1}{2}$ of 1% for each additional complete month.

For Members who retire on an early retirement date on or after May 1, 2000, the pension payable on early retirement is reduced by $\frac{1}{2}$ of 1% for each complete month by which early retirement date precedes the first day of the month coincident with or next following age 62.

In any event, the reduced pension cannot be less than the actuarial equivalent of the Member's accrued pension.

Postponed Retirement

Eligibility

Any age after normal retirement date; pension commencement under the Plan may not be postponed beyond the end of the calendar year in which the Member attains age 71.

Benefit

The Member continues to make required contributions, his or her service continues to accrue and the Member will receive a pension on his or her postponed retirement date based on Credited Service, Final Average Earnings and Average Year's Maximum Pensionable Earnings at that date, subject to the paragraphs below.

A Member who is a Faculty Employee employed by the University since prior to January 1, 1969 is permitted, if he or she elects on or before normal retirement date to postpone retirement by no more than three years following the first of the month coincident with or next following the end of the contract year during which he or she attains age 65, to elect on or before normal retirement date to cease making any further contributions to the Plan. Such Member shall receive a pension equal to the actuarial equivalent of the pension they would have received at normal retirement date.

Plan Provisions (continued)

Postponed Retirement (continued)

Benefit (continued)

A Member who is a non-union Staff Employee employed by the University since prior to January 1, 1969 is permitted, if he or she elects on or before normal retirement date to postpone retirement by no more than three years following the first of the month coincident with or next following the normal retirement date, to elect on or before normal retirement date to cease making any further contributions to the Plan. Such Member shall receive a pension equal to the actuarial equivalent of the pension they would have received at normal retirement date.

Disability

Eligibility

Any age prior to age 65.

Benefit

Members who are in receipt of income disability benefits under the long-term disability insurance plan of the University cease to contribute while disabled but continue to accrue Credited Service for pension purposes.

Starting July 1, 1984, accrued pensions for LTD Members are based on pensionable earnings, to date of disability, increased each year by a percentage which is determined annually by the Committee.

Plan Provisions (continued)

Termination Benefits

Eligibility

Any age prior to early retirement date.

Benefit

A Member whose service terminates is entitled to a locked-in fully vested deferred pension commencing at his normal retirement date.

The early retirement reduction applicable if the former Member commences receipt of the pension prior to normal retirement date, on or after early retirement date, is equal to 1/3 of 1% for each of the first 60 complete months by which early retirement precedes the normal retirement date plus ½ of 1% for each additional complete month.

A Member who terminates employment and is entitled to a locked-in vested deferred pension may request that an amount equal to the commuted value of the deferred pension entitlement be transferred to another registered pension plan, to a prescribed locked-in retirement savings arrangement or to an insurance company for the purchase of a life annuity that will not commence benefit payments prior to the Member's early retirement date. Different provisions applied for those members who terminated employment prior to July 1, 2012

Death Benefits

Eligibility

Any age.

Benefit

On the death of a Member while in the service of the University, a refund of the commuted value of the accrued pension, subject to the 50% minimum employer cost rule plus any additional voluntary contributions, are paid to the Member's spouse, or if no spouse, the Member's designated beneficiary or estate. Different pensions applied prior to July 1, 2012.

Minimum Employer Cost

On retirement, death, or termination, the Required Member Contributions with credited interest cannot provide more than 50% of the commuted value of the benefit. In the event that the Required Member Contributions with credited interest provide for more than 50%, the excess will be refunded to the Member or the Member's beneficiary or estate, as applicable or in the case of retirement be used to increase the lifetime pension.

Plan Provisions (continued)

Normal Form of Pension

The normal form of pension payable to a Member is a life annuity with a ten-year guarantee period.

For Members who terminated prior to May 1, 1998 and are entitled to a deferred pension under the Plan, the normal form is a life annuity with a five-year guarantee period.

Cost-of-Living Adjustments

The pension of each Member receiving pension payments on May 1 of any year shall be adjusted by the Postretirement Cost-of-Living Factor for each year, provided that the Member has received at least one regular pension payment prior to May 1.

For any pension benefits accrued prior to January 1, 2014, this factor is obtained by dividing the average Consumer Price Index for the preceding calendar year by the average index for the next preceding calendar year. In the first year of retirement, the increase will be provided on a pro-rata basis subject to the *Income Tax Act* rules. However, if this factor exceeds 105% and if the financial position of the Plan is not sufficient to provide for this increase, the factor may be reduced, within certain limits, to maintain the solvency of the Plan.

For any pension benefits accrued on and after January 1, 2014 this factor is obtained by dividing the average Consumer Price Index from the preceding calendar year by the average index for next preceding calendar year, and then multiplying the result by 0.75. However, if this factor exceeds 103.75% and if the financial position of the plan is not sufficient to period for this increase, the factor may be reduced, within certain limits, to maintain the solvency of the Plan.

In 2009, the date of the annual adjustment changed from July 1 to May 1, with the first such adjustment as of May 1, 2009 prorated to reflect the ten-month period since the prior adjustment.

All terminated Members who are entitled to a terminated vested pension except for those who terminated between July 1, 1977 and December 31, 1986 shall have their terminated vested pensions adjusted on May 1 (July 1 prior to 2009) of each year by a cost-of-living factor to be determined annually by the Committee, subject to the *Income Tax Act* Rules.

Notwithstanding the foregoing, if a Member terminates employment on or after January 1, 2008 and is not within ten years of his or her Normal Retirement Date, or has not completed 20 years or more of continuous employment, the Cost of Living Factor shall only apply to the terminated vested member's pension earned in respect of Credited Service prior to January 1, 2008.

Plan Provisions (continued)

Member Contributions

Effective January 1, 2013, members are required to contribute 6.25% of annual earnings up to the YMPE, 8.95% of annual earnings that exceed the YMPE but are less than two times the YMPE, and 9.95% of annual earnings in excess of two times the YMPE, subject to the amount permitted under the Income Tax Act for the year.

Effective May 1, 2009, Members were required to contribute 5.80% of annual Earnings up to the YMPE, 8.30% of annual Earnings that exceed the YMPE but are less than two times the YMPE, and 9.65% of annual Earnings in excess of two times the YMPE, subject to the amount permitted under the *Income Tax Act* for the year.

Effective July 1, 2008, Members were required to contribute 5.05% of annual Earnings up to the YMPE, 7.85% of annual Earnings that exceed the YMPE but are less than two times the YMPE, and 9.20% of annual Earnings in excess of two times the YMPE, subject to the maximum amount permitted under the *Income Tax Act* for the year.

Effective July 1, 2007, Members were required to contribute 4.80% of annual Earnings up to the YMPE, 7.175% of annual Earnings that exceeds the YMPE but are less than two times the YMPE, and 7.85% of annual Earnings in excess of two times the YMPE, subject to the maximum amount permitted under the *Income Tax Act* for the year.

For the period January 1, 2003 to June 30, 2007, Members were required to contribute 4.55% of annual Earnings up to the YMPE and 6.50% of the excess of Earnings above the YMPE, subject to the maximum amount permitted under the *Income Tax Act* for the year.

Prior to May 1, 1998, Members were required to contribute 4.875% of annual Earnings up to the YMPE and 6.50% of the excess of annual Earnings above the YMPE, subject to the maximum amount permitted under the *Income Tax Act* for the year. Between May 1, 1998 and January 1, 2003, there were temporary reductions in these member contribution rates.

These contributions are credited with interest each year at the four-year arithmetical average rate of return on the pension fund, excluding real return bonds, calculated at December 31st of the prior year. Effective January 1, 2012, the interest credit will be the CANSIM rate.

Plan Provisions (continued)

Member Flexible Pension Plan Contributions

Prior to January 1, 2014, members are permitted to make additional flexible Pension Plan contributions on December 31st of each year up to the maximum deductible contribution permitted by the *Income Tax Act*.

On retirement or termination of membership, a Member's flexible Pension Plan contribution balance may be used to purchase additional ancillary benefits under the Pension Plan, up to the maximum ancillary benefits permitted by the *Income Tax Act*.

Flexible contributions that cannot be used to purchase ancillary benefits will be forfeited by the Member.

Transfers to the Pension Fund

A new Member may transfer the value of his or her benefits earned under the registered pension plan of a previous employer into the pension fund. The terms and conditions of such transfer and the benefits that will be payable are determined in accordance with Article 12 of the Plan, as amended from time to time.

Definitions

Credited Service

Member's years and completed months of continuous employment with the University while a member in the Plan.

For service of a member employed on a part-time basis, the period of service is multiplied by the proportion the member's reduced work load bears to a regular full-time work load.

Earnings

Staff Employees

Base salary, excluding overtime pay, reimbursement for expenses, special payments, shift premiums, week-end provisions, special allowances and other like payments.

Faculty Employees

Base salary, excluding reimbursement for expenses, administrative stipends, faculty research fellowships, seasonal stipends, summer teaching stipends, special payments, consulting fees, special allowances and other like payments.

Appendix B - Actuarial Assumptions at January 1, 2017 and January 1, 2014

Going Concern Valuation

Retirement Age	Age 64, but no earlier than one year after the valuation date. For Terminated Vested Members—age 65.
Mortality Rates	2014 Canadian Pensioner Mortality Combined Table ("CPM 2014 Combined") with Improvement Scale CPM-B.
Withdrawal Rates	Table A following.
Disability Rates	None assumed.
Increase in Consumer Price Index (CPI)	2.00% per annum at January 1, 2017; 2.25% at January 1, 2014.
Increase in Year's Maximum Pensionable Earnings	2.75% per annum at January 1, 2017; 3.00% at January 1, 2014 (CPI+0.75%).
Increase in <i>Income Tax Act</i> Maximum Pension	\$2,914.44 in 2017; Maximum Pension Limit increases at 2.75% per annum at January 1, 2017 thereafter to the plan maximum of \$3,200.00; 3.00% per annum at January 1, 2014.
Increase in Pensionable Earnings	Active Members: 4.00% per annum at January 1, 2017; 5.00% per annum for 1 year and 4.25% per annum thereafter at January 1, 2014 (CPI + 2.0% merit and promotion). Members on LTD: 2.00% per annum at January 1, 2017; 2.25% per annum at January 1, 2014.
Interest Rate	5.50% per annum, net of all expenses, at January 1, 2017; 6.00% per annum, net of all expenses, at January 1, 2014.
Interest Rate on Required Member Contributions	3.00% per annum.
Interest Rate Used to Calculate 50% Rule	1.30% per annum for 10 years; 1.60% per annum thereafter at January 1, 2017 1.70% per annum for 10 years; 2.30% per annum thereafter at January 1, 2014.
Loading for Administrative Expenses	Reflected in interest rate.

Actuarial Assumptions (continued)

Going Concern Valuation (continued)

Actuarial Value of Assets

At January 1, 2017 the value of assets is set equal to the market value, less a funding reserve equal to the gain on the sale of the real return bonds.

At January 1, 2014, the value of real return bonds was set equal to the projected cash flows discounted to valuation date at 3.75% real rate of return. All other assets were set equal to market value.

Actuarial Cost Method

Projected unit credit cost method.

Actuarial Assumptions (continued)

Solvency Valuation

Retirement Age

Active, Suspended and Disabled Members with less than 55-age-plus-service points

Normal Retirement Date.

Active, Suspended and Disabled Members with at least 55 age-plus-service points

Integral age between ages 55 and 65 that produces highest present value.

Mortality Rates

2014 Canadian Pensioners Combined Mortality Table with Improvement Scale CPM-B at January 1, 2017.
1994 Uninsured Pensioner Mortality Table with Generational Mortality Improvements under Scale AA at January 1, 2014.

Interest Rates-Without Escalated Adjustment

Active, Suspended and Disabled Members age 55 and over, and Retired Members

3.12% per annum at January 1, 2017;
3.83% per annum at January 1, 2014.

Active Members under age 55

2.30% per annum for 10 years, 3.70% per annum thereafter at January 1, 2017;
3.10% per annum for 10 years, 4.60% per annum thereafter at January 1, 2014.

Terminated Vested Members

3.12% per annum at January 1, 2017;
3.83% per annum at January 1, 2014.

Interest Rates-With Escalated Adjustment

Active, Suspended and Disabled Members age 55 and over, Retired Members, and Terminated Vested Members

-0.09% per annum for 100% indexed benefits and 0.71% per annum for 75% indexed benefits at January 1, 2017;
0.15% per annum at January 1, 2014.

Active, Suspended and Disabled Members under age 55

1.30% per annum for 10 years, 1.60% per annum thereafter for 100% indexed benefits at January 1, 2017 and 1.50% per annum for 10 years, 2.10% per annum for 10 years for 75% indexed benefits at January 1, 2017;

1.70% per annum for 10 years, 2.30% per annum thereafter at January 1, 2014.

Actuarial Assumptions (continued)

We have made the following assumptions regarding how the Plan's benefits would be settled on Plan wind-up:

	Percent of Liability Assumed to be Settled by Purchase of Annuities	Percent of Liability Assumed to be Settled by Lump-Sum Transfer
Active members—not retirement eligible	0%	100%
Active members—retirement eligible	100%	0%
Terminated vested members—not retirement eligible	100%	0%
Terminated vested members—retirement eligible	100%	0%
Retired members and surviving spouse	100%	0%

Actuarial Assumptions (continued)

Table A

Withdrawals per 1,000 Participants:

Present Age	Rates	Present Age	Rates
20	100	45	17
21	100	46	16
22	100	47	15
23	100	48	14
24	100	49	13
25	100	50	12
26	90	51	11
27	80	52	10
28	71	53	9
29	63	54	8
30	56	55	7
31	50	56	6
32	45	57	5
33	40	58	4
34	36	59	3
35	32	60	2
36	30	61	1
37	28	62+	0
38	26		
39	24		
40	22		
41	21		
42	20		
43	19		
44	18		

**Appendix C - Personnel Information at January 1, 2017 and
January 1, 2014**

Active Members (Including Leaves)

	January 1, 2014	January 1, 2017
Number of Members		
Males	1,883	2,089
Females	<u>2,008</u>	<u>2,237</u>
Total	3,891	4,326
Average Age		
Males	48.4	48.2
Females	46.9	46.7
Total	47.6	47.4
Average Years of Credited Service		
Males	11.4	11.1
Females	9.7	9.7
Total	10.6	10.4
Average Pensionable Earnings for Following Year	\$ 89,973	\$ 96,884
Total Pensionable Earnings for Following Year	\$ 350,083,948 ¹	\$ 419,120,983 ²

¹ Total Pensionable Earnings for Following Year for Active and Disabled Members is \$355,493,493

² Total Pensionable Earnings for Following Year for Active and Disabled Members is \$423,325,492

Personnel Information (continued)

Disabled Members

	January 1, 2014	January 1, 2017
Number of Members		
Males	26	18
Females	<u>71</u>	<u>56</u>
Total	97	74
Average Age		
Males	57.1	56.6
Females	56.2	55.7
Total	56.4	55.9
Average Years of Credited Service		
Males	19.4	19.2
Females	17.7	17.1
Total	18.1	17.6
Average Pensionable Earnings for Following Year	\$ 55,769	\$ 56,818
Total Pensionable Earnings for Following Year	\$ 5,409,545 ¹	\$ 4,204,509 ²

Suspended Members

	January 1, 2014	January 1, 2017
Number of Members	11	10
Average Age	32.6	33.6
Average Years of Credited Service	2.7	2.3

¹ Total Pensionable Earnings for Following Year for Active and Disabled Members is \$355,493,493

² Total Pensionable Earnings for Following Year for Active and Disabled Members is \$423,325,492

Personnel Information (continued)

Retired and Terminated Vested Members

Following are some pertinent characteristics of the retired and terminated vested members' data as of January 1, 2014 and January 1, 2017.

Retired Members and Beneficiaries Receiving Lifetime Pensions

	Number	Average Age	Average Annual Pension	Total Annual Pension
January 1, 2017	1,837	74.4	\$ 30,028	\$ 55,162,643
January 1, 2014	1,603	74.2	\$ 28,577	\$ 45,809,128

Deferred Pensioners Subject to COLA

	Number	Average Age	Average Annual Pension	Total Annual Pension
January 1, 2017	477	50.6	\$ 6,701	\$ 3,196,322
January 1, 2014	475	48.9	\$ 5,964	\$ 2,832,823

Deferred Pensioners—Others

	Number	Average Age	Average Annual Pension	Total Annual Pension
January 1, 2017	8	67.6	\$ 980	\$ 7,838
January 1, 2014	9	64.5	\$ 872	\$ 7,850

Appendix D: Asset Data

	2014 (000's)	2015 (000's)	2016 (000's)
Market Value of Assets, Beginning of Year	\$ 1,194,776	\$ 1,316,510	\$ 1,402,751
Plus: University Contributions	42,373	45,003	47,679
Participant Contributions	26,037	27,587	29,217
Incoming Transfers	1,552	1,655	2,220
Net Investment Gain (Loss)	114,532	70,629	99,934
Less: Pensions and lump sum refunds paid	(61,351)	(57,283)	(60,993)
Fees ¹	<u>(1,409)</u>	<u>(1,350)</u>	<u>(1,795)</u>
Market Value of Assets, End of Year	\$ 1,316,510	\$ 1,402,751	\$ 1,519,013
Return on Market Value, After Fees and Expenses	9.43%	5.23%	6.95%

¹ Includes investment management fees, custodial fees, and administration fees