THE CONTRIBUTORY PENSION PLAN FOR HOURLY-RATED EMPLOYEES OF MCMASTER UNIVERSITY INCLUDING MCMASTER DIVINITY COLLEGE

REPORT ON THE ACTUARIAL VALUATION FOR FUNDING PURPOSES AS AT JULY 1, 2016

REVISED FEBRUARY 2018

Financial Services Commission of Ontario Registration Number: 0215418
Canada Revenue Agency Registration Number: 0215418

Note to reader regarding actuarial valuations:

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

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

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

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

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

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

CONTENTS

1

Summary of Results ($000)

Going-Concern Financial Position	**01.07.2016**	**01.07.2013**
Smoothed value of assets	$53,452	$41,068
Actuarial liability	51,871	46,637
Funding excess (shortfall)	$1,581	($5,569)
Solvency and Wind-Up Financial Position		
Market value of assets net of termination expenses and in-transit items	$52,761	$42,310
Total wind-up liabilities	73,210	58,429
Solvency and wind-up excess (shortfall)	($20,449)	($16,119)
Transfer ratio	0.72	0.73
Funding Requirements (annualised)[1]		
Total current service cost	$1,262	$1,393
Less: Estimated Member contributions	(531)	(644)
University current service cost	$731	$749
University current service cost as a percentage of members' contributions	138%	116%
Minimum special payments		
2013/2014	-	$543
2014/2015	-	$587
2015/2016	-	$587
2016/2017	$371	
2017/2018	$1,184	
2018/2019	$1,184	
Estimated minimum university contribution for year:		
2013/2014	-	$1,292
2014/2015	-	$1,337
2015/2016	-	$1,337
2016/2017	$1,102	
2017/2018	$1,843	
2018/2019	$1,777	
Estimated maximum university contribution for the Plan year following the valuation date	$21,180	$16,868
Next required valuation date	July 1, 2019	July 1, 2016

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

2

Introduction

To McMaster University

At the request of McMaster University (the "University"), we have conducted an actuarial valuation of The Contributory Pension Plan for Hourly-Rated Employees of McMaster University Including McMaster Divinity College (the "Plan"), sponsored by the University, as at the valuation date, July 1, 2016. We are pleased to present the results of the valuation.

Purpose

The purpose of this valuation is to determine:

- The funded status of the Plan as at July 1, 2016 on going concern, hypothetical wind-up and solvency bases,
- The minimum required funding contributions from July 1, 2016 in accordance with the *Pension Benefits Act of Ontario* and in accordance with the solvency funding relief measures applicable to pension plans in the broader public sector; and
- The maximum permissible funding contributions from July 1, 2016 in accordance with the *Income Tax Act*.

Funding Relief

The Regulations to the *Pension Benefits Act* were amended in May 2011 and further amended in November 2013, in May 2014 and in November 2016. The amendments include the solvency funding relief measures that were introduced for pension plans in the broader public sector. The solvency funding relief measures introduced in November 2016 allow the administrator of the plan to:

- defer the start of any new going concern special payment schedules by up to twelve months;
- make solvency special payments in each month not less than an amount which represents interest on 75% of the solvency deficiency as at the date of the first valuation report following the Stage 2 valuation report plus amortization of the remaining 25% of that solvency deficiency over 7 years;
- file the next funding valuation report with an effective date which is three years after the valuation date.

The University has elected to apply these solvency funding relief measures..

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

In accordance with pension benefits legislation, the next actuarial valuation of the Plan will be required as at a date not later than July 1, 2019, or as at the date of an earlier amendment to the Plan.

Terms of Engagement

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

- It has been prepared in accordance with applicable pension legislation and actuarial standards of practice Canada.
- As instructed by the University, we have reflected a margin for adverse deviations in our going-concern valuation by reducing the going-concern discount rate by 0.25% per year.
- We have reflected the University's decisions for determining the solvency funding requirements, summarized as follows:

  - The same plan wind-up scenario was hypothesized by both hypothetical wind-up and solvency valuations;
  - Although permissible, no benefits were excluded from the solvency liabilities;
  - The solvency financial position was determined on a market value basis;
  - Solvency relief measures have been applied as described above in the Funding Relief section.

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

Events since the Last Valuation at July 1, 2013

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

This valuation reflects the provisions of the Plan as at July 1, 2016. The Plan has not been amended since the date of the previous valuation, and we are not aware of any pending definitive or virtually definitive amendments coming into effect during the period covered by this report. The Plan provisions are summarized in Appendix F.

Assumptions

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

Assumption	Current valuation	Previous valuation
Discount rate:	5.00%	5.50%
Pensionable earnings increase	3.25%	3.50%

Assumption	Current valuation	Previous valuation
Interest on employee contributions	5.00%	5.75%

The hypothetical wind-up and solvency assumptions have been updated to reflect market conditions at the valuation date.

A summary of the going concern, and hypothetical wind-up and solvency assumptions are provided in Appendices C and D, respectively.

Regulatory Environment and Actuarial Standards

There have been a number of changes to the Act and regulations which impact the funding of the Plan

The Government of Ontario has announced its intentions to makes changes to the funding requirements for pension plans registered in Ontario. Since then Bill 120 received Royal assent. However, the intended changes to the funding requirements which impact the funding of single-employer pension plans will be contained in regulations which have not yet been adopted.

At its meeting on June 9, 2015, the Actuarial Standards Board (ASB) decided to promulgate the use of the following mortality table with respect of the computation of pension commuted values ("CIA CV Standard"), effective October 1, 2015: *Mortality rates equal to the 2014 Canadian Pensioners Mortality Table (CPM2014) combined with mortality improvement scale CPM Improvement Scale B (CPM-B)*. The change affects the mortality assumption used to value the solvency and wind-up liabilities for benefits assumed to be settled through a lump sum transfer. The financial impact of the change in the CIA CV Standard has been reflected in this actuarial valuation on a solvency and hypothetical wind-up basis.

Subsequent Events

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

Impact of Case Law

This report has been prepared on the assumption that all claims on the Plan after the valuation date will be in respect of benefits payable to members of the Plan determined in accordance with the Plan terms and that all Plan assets are available to provide for these benefits. It is possible that court and regulatory decisions and changes in legislation could give rise to additional entitlements to benefits under the Plan and cause the results in this report to change. By way of example, we bring your attention to the following decisions:

- The Ontario Court of Appeal's 2003 decision in *Aegon Canada Inc. and Transamerica Life Canada versus ING Canada Inc.* restricted the use of original plan surplus where two or more pension plans were merged.
- The Supreme Court of Canada's 2004 decision in *Monsanto Canada Inc. versus Superintendent of Financial Services* upheld the requirement, with retroactive effect, to distribute surplus on partial plan wind-up under the *Pension Benefits Act (Ontario).*

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

3

Valuation Results – Going-Concern

Financial Status

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

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

Financial Position – Going-Concern Basis ($000)

	01.07.16	**01.07.13**
Assets		
Market value of assets	$52,848	$42,351
Asset smoothing adjustment	541	(1,392)
In-transits	63	109
Smoothed value of assets	$53,452	$41,068
Going concern funding target		
▪ active members	$23,260	$22,583
▪ pensioners and survivors	27,155	23,500
▪ deferred pensioners	1,426	554
▪ pending members	30	-
Total	$51,871	$46,637
Funding excess (shortfall)	$1,581	($5,569)

The going concern funding target includes a provision for adverse deviations.

Reconciliation of Financial Status ($000)

Funding excess (shortfall) as at previous valuation		($5,569)
Interest on funding excess (funding shortfall) at 5.50% per year		(970)
Employer's special payments, with interest		2,058
Expected funding excess (funding shortfall)		($4,481)
Net experience gains (losses)		
▪ Net Investment return*	7,556	
▪ Increases in pensionable earnings	1,123	
▪ Indexation	(1,235)	
▪ Mortality	514	
▪ Retirement	(344)	
▪ Termination	338	
Total experience gains (losses)		7,952
Impact of changes in assumptions		
▪ Discount rate	(2,518)	
▪ Pensionable earnings increase	216	
Total assumption changes impact		(2,302)
Impact of higher member contributions on excess cost sharing refunds		(465)
Impact of correction to joint and survivor forms of pension		709
Net impact of other elements of gains and losses		168
Funding excess (shortfall) as at current valuation		$1,581

* based on smoothed asset value

Current Service Cost

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

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

Employer's Current Service Cost ($000)

	2016/2017	2013/2014
Total current service cost	1,262	1,393
Estimated members' required contributions	(531)	(644)
Estimated employer's current service cost	731	749
Employer's current service cost expressed as a percentage of members' required contributions	138%	116%

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

Changes in Employer's Current Service Cost

Employer's current service cost as at previous valuation	116%
Demographic changes	1%
Changes in assumptions	13%
Coding updates	8%
Employer's current service cost as at current valuation	138%

Discount Rate Sensitivity

The following table summarizes the effect on the going concern funding target and current service cost shown in this report of using a discount rate which is 1% lower than that used in the valuation.

Scenario	Valuation Basis	Reduce Discount Rate by 1%
Going-concern funding target	**$51,871**	**$58,776**
Current service cost		
• Total current service cost	$1,262	$1,506
• Estimated members' required contributions	(531)	(531)
• Estimated employer's current service cost	$731	$975

4

Valuation Results - Hypothetical Wind-up

Financial Position

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

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

Hypothetical Wind-up Position ($000)

	01.07.16	01.07.13
Assets		
Market value of assets	$52,848	$42,351
In transits	63	109
Termination expense provision	(150)	(150)
Wind-up assets	$52,761	$42,310
Present value of accrued benefits for:		
▪ active members	$36,289	$30,454
▪ pensioners and survivors	34,520	27,215
▪ deferred pensioners	2,371	760
▪ Pending Liability	30	0
Total wind-up liability	$73,210	$58,429
Wind-up excess (shortfall)	($20,449)	($16,119)

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.

Wind-up Incremental Cost

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

The hypothetical wind-up incremental cost determined in this valuation, is as follows:

	01.07.2016	**01.07.2013**
Number of years covered by report	3 years	3 years
Total hypothetical wind-up liabilities at the valuation date (A)	$73,210	$58,429
Present value of projected hypothetical wind-up liability at the next required valuation (including expected new entrants) plus benefit payments until the next required valuation (B)	$79,064	$63,802
Hypothetical wind-up incremental cost (B – A)	$5,854	$5,373

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

Discount Rate Sensitivity

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

Scenario	**Valuation Basis**	**Reduce Discount Rate by 1%**
Total hypothetical wind-up liability	$73,210	$84,206

5

Valuation Results – Solvency

Overview

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

Exceptions	Reflected in valuation based on the terms of engagement
The circumstance under which the Plan is assumed to be wound-up could differ for the solvency and hypothetical wind-up valuations.	Same circumstances were assumed for the solvency valuation as were assumed for the hypothetical wind-up.
Certain benefits can be excluded from the solvency financial position. These include: (a) any escalated adjustment (e.g. indexing), (b) certain plant closure benefits, (c) certain permanent layoff benefits, (d) special allowances other than funded special allowances, (e) consent benefits other than funded consent benefits, (f) prospective benefit increases, (g) potential early retirement window benefit values, and (h) pension benefits and ancillary benefits payable under a qualifying annuity contract.	No benefits were excluded from the solvency liabilities shown in this valuation.
The financial position on the solvency basis needs to be adjusted for any Prior Year Credit Balance.	Not applicable.
The solvency financial position can be determined by smoothing assets and the solvency discount rate over a period of up to 5 years.	Smoothing was not used.
The benefit rate increases coming into effect after the valuation date can be reflected in the solvency valuation.	Not applicable.

Exceptions	Reflected in valuation based on the terms of engagement
In accordance with actuarial standards, the termination expense provision used for the hypothetical wind-up valuation includes a reduction in the value of the Plan's assets resulting from their liquidation and a provision for the related transaction fees. Since the solvency valuation is based on the market value of assets and not the liquidated value of assets, these adjustments can be excluded from the solvency termination expense provision.	The termination expense provision used in the solvency valuation is $150,000, which is the same as the provision used for the hypothetical wind-up valuation.

Financial Position

The financial position on a solvency basis is the same as the financial position on the Hypothetical Wind-up basis shown in the previous section. The transfer ratio is 72%, compared to 73% at the previous valuation.

6

Minimum Funding Requirements

The Act prescribes the minimum contributions that the University must make to the Plan. The minimum contributions in respect of a defined benefit component of a pension are comprised of going concern current service cost and special payments to fund any going concern or solvency shortfalls.

The University has elected to make use of the solvency relief measures for pension plans in the broader public sector. Accordingly, the minimum monthly contribution requirements determined herein reflect the requirements under the solvency funding relief regulation for pension plans in the broader public sector announced in November 2016.

On the basis of the assumptions and methods described in this report, the rule for determining the minimum required employer monthly contributions, as well as an estimate of the employer contributions, from the valuation date until the next required valuation are as follows:

	Employer's contribution rule			Estimated employer's contributions	
Period beginning	**Monthly current service cost[2]**	**Explicit monthly expense allowance**	**Minimum monthly special payments**	**Monthly current service cost including expense allowance**	**Total minimum monthly contributions**
July 1, 2016 – June 30, 2017	138%	$0	$30,929	$60,956	$91,885
July 1, 2017 – June 30, 2018	138%	$0	$98,692	$54,860	$153,552
July 1, 2018 – June 30, 2019	138%	$0	$98,692	$49,374	$148,066

The estimated contribution amounts above are based on projected member's required contributions. Therefore the actual employer's current service cost will be different from the above estimates and, as such, the contribution requirements should be monitored closely to ensure contributions are made in accordance with the Act.

The development of the minimum special payments is summarized in Appendix A.

Other Considerations

Differences Between Valuation Bases

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

[2] Expressed as a percentage of members' required contributions.

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

Timing of Contributions

Funding contributions are due on a monthly basis. Contributions for current service cost must be made within 30 days following the month to which they apply. Special payment contributions must be made in the month to which they apply.

Retroactive Contributions

The Company must contribute the excess, if any, of the minimum contribution recommended in this report over contributions actually made in respect of the period following the valuation date. This contribution, along with an allowance for interest, is due no later than 60 days following the date this report is filed.

Payment of Benefits

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

Additional restrictions are imposed when:

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

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

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

Letters of Credit

Minimum funding requirements in respect of solvency deficiencies that otherwise require monthly contributions to the pension fund may be met, in the alternative, by establishing an irrevocable letter of credit subject to the conditions established by the Act. Required solvency special payments in excess of those met by a letter of credit must be met by monthly contributions to the pension fund.

7

Maximum Eligible Contributions

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

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

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

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

Schedule of Maximum Contributions

The University is permitted to fully fund the greater of the going concern and hypothetical wind-up shortfalls; $20,449,000, as well as make current service cost contributions. The portion of this contribution representing the payment of the hypothetical wind-up shortfall can be increased with interest at 2.42% per year from the valuation date to the date the payment is made, and must be reduced by the amount of any deficit funding made from the valuation date to the date the payment is made.

Assuming the University contributes the greater of the going concern and hypothetical wind-up shortfall of $20,449,000 as of the valuation date, the rule for determining the estimated maximum eligible annual contributions, as well as an estimate of the maximum eligible contributions until the next valuation, are as follows:

Employer's contribution rule				Estimated employer's contributions
Year beginning	**Monthly current service cost[3]**	**Monthly expense allowance**	**Deficit Funding**	**Monthly current service cost including expense allowance**
July 1, 2016	138%	$0	n/a	$60,956
July 1, 2017	138%	$0	n/a	$54,860
July 1, 2018	138%	$0	n/a	$49,374

The employer's current service cost in the above table was estimated based on projected members' required contributions. The actual employer's current service cost will be different from these estimates and, as such, the contribution requirements should be monitored closely to ensure compliance with the ITA.

[3] Expressed as a percentage of members' required contributions.

8

Actuarial Opinion

In my opinion, for the purposes of this valuation,

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

This report has been prepared, and my opinion given, in accordance with accepted actuarial practice in Canada. It has also been prepared in accordance with the funding and solvency standards set by the Pension Benefits Act of Ontario.

Lorraine Gignac

Lorraine Gignac
Fellow of the Society of Actuaries

Fellow of the Canadian Institute of Actuaries

February 13, 2018

Date

APPENDIX A

Prescribed Disclosure

Definitions

The Act defines a number of terms as follows:

Defined Term	Description	Result
Transfer Ratio	The ratio of: (a) solvency assets minus the lesser of the Prior Year Credit Balance and the minimum required employer contributions until the next required valuation; to (b) the sum of the solvency liabilities and liabilities for benefits, other than benefits payable under qualifying annuity contracts that were excluded in calculating the solvency liabilities.	0.72
Prior Year Credit Balance	Accumulated excess of contributions made to the pension plan in excess of the minimum required contributions (note: only applies if the University chooses to treat the excess contributions as a Prior Year Credit Balance).	$0
Solvency Assets	Market value of assets including accrued or receivable income and excluding the value of any qualifying annuity contracts	$52,911,000
Solvency Asset Adjustment	The sum of:	
	(a) the difference between smoothed value of assets and the market value of assets;	$0
	(b) the present value of any going concern special payments (including those identified in this report) to the end of the solvency amortization period;	$0
	(c) the present value of any previously scheduled solvency special payments (excluding those identified in this report)	$0
		$0
Solvency Liabilities	Liabilities determined as if the plan had been wound up on the valuation date, including liabilities for plant closure benefits or permanent layoff benefits that would be immediately payable if the employer's business were discontinued on the valuation date of the report, but excluding liabilities for, (a) any escalated adjustment, (b) excluded plant closure benefits, (c) excluded permanent layoff benefits, (d) special allowances other than funded special allowances, (e) consent benefits other than funded consent benefits, (f) prospective benefit increases, (g) potential early retirement window benefit values, and (h) pension benefits and ancillary benefits payable under a qualifying annuity contract.	$73,210,000

Defined Term	Description	Result
Solvency Liability Adjustment	The amount by which Solvency Liabilities are adjusted as a result of using a solvency valuation interest rate that is the average of market interest rates calculated over the period of time used in the determination of the smoothed value of assets.	Not applicable
Solvency Deficiency	The amount, if any, by which the sum of:	
	(a) the solvency liabilities	$73,210,000
	(b) the solvency liability adjustment	$0
	(c) the prior year credit balance	$0
		$73,210,000
	Exceeds the sum of	
	(d) the solvency assets net estimated termination expenses[4]	$52,761,000
	(e) the solvency asset adjustment	$0
	Solvency Deficiency	$20,449,000

Timing of Next Required Valuation

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

- The ratio of solvency assets to solvency liabilities is less than 85%.
- The employer elected to exclude plant closure or permanent lay-off benefits under Section 5(18) of the regulations, and has not rescinded that election.

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

In accordance with the solvency funding relief measures for pension plans in the broader public sector, the next valuation of the Plan will be required as of July 1, 2019.

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

Special Payments

Based on the results of this valuation, the Plan is not fully funded.

The University has elected to make use of the solvency relief measures for pension plans in the broader public sector. Accordingly, the minimum monthly contribution requirements determined herein reflect the provisions of the solvency funding relief regulation issued in November 2016.

As such, special payments must be made as follows:

Type of payment	Start date	End date	Monthly Special Payment
Solvency*	July 1, 2016	June 30, 2017	$30,929
Solvency	July 1, 2017	June 30, 2024	$98,692

As the Plan does not have a going concern deficit, going concern special payments revealed in the previous valuation are no longer required.

Pursuant to the solvency funding relief measures for pension plans in the broader public sector, the minimum solvency special payments are calculated as follows:

a.	Solvency Assets	52,761,000	
b.	Solvency liabilities	73,210,000	
c	Solvency asset adjustment (present value of going-concern special payments)	0	
d.	solvency ratio	0.72	a./b.
e.	1- solvency ratio	0.28	1-d.
f.	solvency ratio + 25% * (1- solvency ratio)	0.790510176	d. + 0.25*e.
g.	modified solvency liabilities	57,873,250	b. * f.
h.	modified solvency deficit	5,112,250	max(g.-a.-c.,0)
i	modified solvency special payments	813,151	amortization of h. over 7 yrs
j	solvency liabilities less modified solvency liabilites	15,336,750	b.-g.
k.	interest on solvency liabilities in excess of modified solvency liabilities	371,149	int*j.
l.	solvency assets + solvency asset adjustment less modified solvency liabilites	0	a.+ c.-g.
m.	interest on solvency assets + solvency asset adjustment in excess of modified solveny liabilities	0	int*l.
n.	excess interest	371,149	k.-m.
o.	solvency special payments (monthly)	98,692	(n. + i.)/12

* to cover interest on solvency shortfall as at July 1, 2016

Pension Benefit Guarantee Fund (PBGF) Assessment

The PBGF assessment base and liabilities are derived as follows:

Solvency assets	$52,911,000	(a)
PBGF liabilities	$73,210,000	(b)
Solvency liabilities	$73,210,000	(c)
Ontario asset ratio	100%	(d) = (b) ÷ (c)
Ontario portion of the fund	$52,911,000	(e) = (a) x (d)
PBGF assessment base	$20,299,000	(f) = (b) – (e)
Amount of additional liability for plant closure and/or permanent layoff benefits which is not funded and subject to the 2% assessment pursuant to s.37(4)	$0	(g)

APPENDIX B

Plan Assets

The pension fund is held in trust by CIBC Mellon. In preparing this report, we have relied upon fund statements prepared by CIBC Mellon without further audit. Customarily, this information would not be verified by a plan's actuary. We have reviewed the information for internal consistency and we have no reason to doubt its substantial accuracy.

Reconciliation of Market Value of Plan Assets

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

Reconciliation of Plan Assets (Market Value - $000)

	2013/2014	2014/2015	2015/2016
As at July 1	$42,351	$48,905	$52,399
PLUS			
Members' contributions	$550	$546	$534
University's contributions	$1,253	$1,157	$1,177
Investment income	$1,340	$1,480	$1,516
Net capital gains (losses)	$6,072	$2,902	$45
	$9,215	$6,085	$3,272
LESS			
Pensions paid	$2,177	$2,296	$2,389
Lump-sums paid	$160	$77	$173
Administration fees	$324	$218	$261
	$2,661	$2,591	$2,823
As at June 30	$48,905	$52,399	$52,848
Gross rate of return[5]	17.7%	9.0%	3.0%
Rate of return net of expenses[5]	16.8%	8.6%	2.5%

[5] Assuming mid-period cash flows.

The market value of assets shown in the above table is adjusted to reflect in-transit amounts as follows ($000):

	Current valuation	Previous valuation
Market value of invested assets	$52,848	$42,351
In-transit amounts		
▪ Members' contributions	$38	$43
▪ University's contributions	$91	$134
▪ Expenses	($1)	($45)
▪ Benefit payments	($65)	($23)
Market value of assets adjusted for in-transit amounts	$52,911	$42,460

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

Investment Policy

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

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

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

	Investment Policy			Actual Asset Mix as at July 1, 2016
	Minimum	Target	Maximum	
Canadian equities	10%	20%	30%	18.9%
US equities	8%	18%	28%	23.9%
Non-North American equities	7%	17%	27%	19.8%
Bonds	25%	45%	65%	36.9%
Cash and cash equivalents	0%	0%	10%	0.5%
		100%		100.0%

APPENDIX C

Methods and Assumptions – Going-Concern

Valuation of Assets

For this valuation, we have continued to use an adjusted market-value method to determine the smoothed value of assets. Under this method, all investment gains (losses) are spread over 3 years.

The asset values produced by this method are related to the market value of the assets, with the advantage that, over time, the market-related asset values will tend to be more stable than market values. To the extent that more capital gains than losses will arise over the long term, the smoothed value will tend to be lower than the market value.

The smoothed value of the assets at July 1, 2016, was derived as follows:

(in $000)

	2013/2014	2014/2015	2015/2016
Market value of assets at July 1st	$42,351	$48,905	$52,399
Payment into Plan	1,803	1,703	1,711
Payment out of Plan*	(2,337)	(2,373)	(2,562)
Expected interest	2,315	2,671	2,859
Investment experience gains/(losses)	4,773	1,493	(1,559)
Market value of assets at June 30th	$48,905	$52,399	$52,848

* other than administration fees

Smoothed Value of Assets as at 01.07.2016

Market value of assets		$52,848
LESS		
Investment experience gains (losses)		
	2015/2016: ($1,559) x 66.67% =	($1,039)
	2014/2015: $1,493 x 33.33% =	498
		$541
Smoothed value of assets		$53,389

The smoothed value of assets shown in the above table is adjusted to reflect in-transit amounts as follows:

	Current valuation	Previous valuation
Smoothed value of assets	$53,389	$40,959
In-transit amounts		
▪ Members' contributions	$38	$43
▪ University's contributions	$91	$134
▪ Expenses	($1)	($45)
▪ Benefit payments	($65)	($23)
Smoothed value of assets, adjusted for in-transit amounts	$53,452	$41,068

Going Concern Funding Target

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

For purposes of the going concern valuation, we have continued to use the projected unit credit actuarial cost method. Under this method, we determine the present value of benefit cash flows expected to be paid in respect of service accrued prior to the valuation date, based on projected final average earnings. This is referred to as the funding target. For each individual plan member, two times the accumulated contributions with interest are established as a minimum actuarial liability.

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

As required under the Act, a funding shortfall will be amortized over no more than 15 years through special payments. A funding excess may, from an actuarial standpoint, be applied immediately to reduce required employer current service contributions unless precluded by the terms of the plan or by legislation.

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

Current Service Cost

The current service cost is the present value of projected benefits to be paid under the plan with respect to service expected to accrue during the period until the next valuation.

The employer’s current service cost is the total current service cost reduced by the members’ required contributions.

The employer’s current service cost has been expressed as a percentage of the members’ required contributions to provide an automatic adjustment in the event of fluctuations in membership and/or pensionable earnings.

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

Actuarial Assumptions – Going Concern Basis

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

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

Assumption	**Current valuation**	**Previous valuation**
Discount rate:	5.00%	5.50%
Inflation:	2.00%	2.00%
ITA limit / YMPE increases:	2.50%	2.50%
Pensionable earnings increases:	3.25%	3.50%
Post retirement pension increases:	0.00%	0.00%
Interest on employee contributions:	5.00%	5.75%
Retirement rates:	20% where first eligible for an unreduced pension, remainder at age 64	20% where first eligible for an unreduced pension, remainder at age 64
Termination rates:	None	None
Mortality rates:	115% of the rates of the 2014 Public Sector Canadian Pensioners Mortality Table (CPM2014Publ)	115% of the rates of the 2014 Public Sector Canadian Pensioners Mortality Table (CPM2014Publ)
Mortality improvements:	Fully generational using CPM Improvement Scale B (CPM-B)	Fully generational using CPM Improvement Scale B (CPM-B)
Disability rates:	None	None

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

Pensionable Earnings

The benefits ultimately paid will depend on each member's final average earnings. To calculate the pension benefits payable upon retirement, death or termination of employment, we have taken rate of pay on July 1, 2016, and assumed that such pensionable earnings will increase at the assumed rate.

Rationale for Assumptions

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

Discount Rate

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

The discount rate is comprised of the following:

- Estimated returns for each major asset class consistent with market conditions on the valuation date and the target asset mix specified in the Plan's investment policy.
- Additional returns assumed to be achievable due to active equity management, equal to the fees related to active equity management. Such fees were determined by the difference between the provision for total investment expenses and the hypothetical fees that would be incurred for passive management of all assets.
- Implicit provision for investment expenses determined as the average rate of investment expenses paid from the fund over the last 3 years
- Implicit provision for non-investment expenses determined as the average rate of non-investment expenses paid from the fund over the last 3 years
- A margin for adverse deviations of 0.25%

The discount rate was developed as follows:

Assumed investment return	5.50%
Active management	0.25%
Implicit expense provision	(0.50%)
Margin for adverse deviation	(0.25%)
Net discount rate	5.00%

Inflation

The inflation assumption is based on the mid-point of the Bank of Canada's inflation target range of between 1% and 3%.

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

The assumption is based on historical real economic growth and the underlying inflation assumption.

Pensionable Earnings

The assumption is based on general wage growth assumptions increased by our best estimate of future merit and promotional increases over general wage growth considering University expectations.

Post Retirement Pension Increases

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

Retirement Rates

The assumption is based on the Plan provisions and our experience with similar plans and employee groups.

Termination Rates

Use of a different assumption would not have a material impact on the valuation.

Mortality Rates

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

Due to the size of the Plan, specific data on plan mortality experience is insufficient to determine the mortality rates. The CPM mortality rates from the public sector have been adjusted after considering plan-specific characteristics, such as the type of employment, the industry experience, the pension and employment income for the plan members, and data in the CPM study.

There is broad consensus among actuaries and other longevity experts that mortality improvement will continue in the future, but the degree of future mortality improvement is uncertain. The mortality improvement scale published in the CPM study represents one reasonable outlook for future improvement. We have used the CPM mortality improvement scale B without adjustment.

Based on to the assumption used, the life expectancy of a member age 65 at the valuation date is 21.8 years for males and 23.6 years for females.

Interest on Employee Contributions

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

APPENDIX D

Methods and Assumptions – Hypothetical Wind-up and Solvency

Hypothetical Wind-up Basis

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

To determine the actuarial liability on the hypothetical wind-up basis, we have valued those benefits that would have been paid had the Plan been wound up on the valuation date, with all members fully vested in their accrued benefits.

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

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

The value of benefits assumed to be settled through a lump sum transfer is based on the assumptions described in Section 3500 – *Pension Commuted Values* of the Canadian Institute of Actuaries' Standards of Practice applicable for July 1, 2016.

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

However, it may not be possible to settle the liabilities through the purchase of annuities due to the size of the Plan and the limited annuity market in Canada. In accordance with the *Canadian Institute of Actuaries Educational Note: Assumptions for Hypothetical Wind-up and Solvency Valuations with Effective Dates Between December 31, 2015 and December 30, 2016 (the "Educational Note"),* we have assumed that the settlement of such liabilities would be priced on the same basis as the smaller group annuities that are available in the market.

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

In this context, we have determined that no adjustment to the mortality rates used in the regular annuity purchase assumptions is required.

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

The assumptions are as follows:

Form of benefit settlement elected by member	
Lump sum	70% of active and deferred members under age 55 and 50% of active and deferred members over age 55 elect to receive their benefit entitlement in a lump sum
Annuity purchase	All remaining members are assumed to elect to receive their benefit entitlement in the form of a deferred or immediate pension. These benefits are assumed to be settled through the purchase of deferred or immediate annuities from a life insurance company.
Basis for benefits assumed to be settled through a lump sum	
Mortality rates:	100% of the rates of the 2014 Canadian Pensioners Mortality Table (CPM2014) with fully generational improvements using CPM Scale B blending 50% male mortality and 50% female mortality
Interest rate:	1.70% per year for 10 years, 3.10% per year thereafter
Basis for benefits assumed to be settled through the purchase of an annuity	
Mortality rates:	100% of the rates of the 2014 Canadian Pensioners Mortality Table (CPM2014) with fully generational improvements using CPM Scale B
Adjustment to mortality rates:	No adjustment
Interest rate:	2.76% per year
Retirement age	
Maximum value:	Members are assumed to retire at the age which maximizes the value of their entitlement from the Plan based on the eligibility requirements which have been met at the valuation date
Grow-in:	The benefit entitlement and assumed retirement age of Ontario members whose age plus service equal at least 55 at the valuation date, reflect their entitlement to grow into early retirement subsidies
Other assumptions	
Special payments	Discounted at the average interest rate of 2.42% per year
Final average earnings:	Based on actual pensionable earnings over the averaging period
Family composition:	Same as for going concern valuation
Maximum pension limit:	$2,890.00
Termination expenses:	$150,000

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

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

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

In determining the provision for termination expenses payable from the Plan's assets, we have assumed that the plan sponsor would not be solvent on the wind-up date. We have also assumed, without analysis, that the Plan's terms as well as applicable legislation and court decisions would permit the relevant expenses to be paid from the Plan.

Actual fees incurred on an actual plan wind-up may differ materially from the estimates disclosed in this report.

Incremental Cost

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

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

- Members terminate, retire, and die consistent with the termination, retirement, and mortality rates used for the going concern valuation.
- Pensionable earnings, the Income Tax Act pension limit, and the Year's Maximum Pensionable Earnings increase in accordance with the related going concern assumptions.
- Active members accrue pensionable service in accordance with the terms of the Plan.
- Cost of living adjustments are consistent with the inflation assumption used for the going concern valuation.

Solvency Basis

In determining the financial position of the Plan on the solvency basis, we have used the same assumptions and methodology as were used for determining the financial position of the Plan on the hypothetical wind-up basis.

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

APPENDIX E

Membership Data

Analysis of Membership Data

The actuarial valuation is based on membership data as at July 1, 2016, provided by McMaster University.

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

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

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

	01.07.2016	01.07.2013
Active Members		
Number	178	232
Total pensionable earnings for the following year	$8,381,396	$10,371,403
Average pensionable earnings for the following year	$47,086	$44,704
Average years of pensionable service	16.5	14.1
Average age	53.4	51.4
Deferred Pensioners		
Number	58	48
Total annual pension	$183,384	$80,372
Average annual pension	$3,162	$1,674
Average age	52.9	50.8
Pensioners and Survivors		
Number	290	294
Total annual lifetime pension	$2,386,871	$2,108,707
Average annual lifetime pension	$8,231	$7,172
Average age	73.9	74.1

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

Reconciliation of Membership

	Actives	Deferred Vested	Pensioners and Beneficiaries	Pending Termination	Total
Total at 01.07.2013	232	48	294	0	574
Terminations:					
▪ Transfers/refunds	(3)	(2)	-	-	(5)
▪ Pending termination	(1)	-	-	1	-
▪ Deferred pensions	(12)	12	-	-	-
Deaths	(3)	-	(40)	-	(43)
Retirements	(35)	-	35	-	-
Beneficiaries	-	-	1	-	1
Expired pensions	-	-	(1)	-	-1
Data corrections	-	-	1	-	1
Total at 01.07.2016	178	58	290	1	527

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

	Years of Pensionable Service							
Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30 +**	**Total**
Under 20								
20 to 24								
25 to 29		1 *						1 *
30 to 34	1 *	1 *	2 *					4 44,759
35 to 39		3 48,303						3 48,303
40 to 44		2 *	8 52,857	2 *				12 51,613
45 to 49	2 *	2 *	20 46,252	5 39,664	4 55,747	4 42,108		37 45,933
50 to 54	2 *	7 39,542	17 47,152	4 37,057	2 *	7 43,660		39 43,737
55 to 59	1 *	4 45,933	16 44,336	5 41,008	8 50,592	6 37,088	5 61,671	45 46,016
60 to 64		3 37,986	13 47,752	3 40,435	2 *	5 54,353	7 58,493	33 50,525
65 +						2 *	2 *	4 54,756
Total	6 37,645	23 45,559	76 47,141	19 40,236	16 53,457	24 45,465	14 58,145	178 47,086

* not shown to protect member confidentiality.

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

	Deferred Pensioners		Pensioners and Survivors	
Age	**Number**	**Average Pension**	**Number**	**Average Pension**
25 – 29				
30 – 34				
35 – 39	4	4,764		
40 – 44	8	1,835		
45 – 49	11	3,259		
50 – 54	13	1,928	3	*
55 – 59	10	6,942	19	11,361
60 – 64	6	2,298	32	10,841
65 – 69	3	992	55	9,255
70 – 74	3	855	55	10,113
75 – 79			49	7,292
80 – 84			28	5,345
85 – 89			29	4,698
90 – 94			19	4,594
95 +			1	*
Total	58	3,162	290	8,231

* not shown to protect member confidentiality.

APPENDIX F

Summary of Plan Provisions

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

This valuation is based on the plan provisions in effect on July 1, 2016. Since the previous valuation, the Plan has not been amended. This summary is not intended as a complete description of the Plan.

Background

The Plan became effective July 1, 1962.

Benefits are based on a set formula and are partially paid for by the University.

Eligibility for membership

The Plan was completely closed to new entrants on or after March 15, 2010.

Employee Contributions

	Employee Contribution Rate on Annual Earnings	
Period Beginning	**Up to YMPE**	**In Excess of YMPE**
July 1,2010	3.50%	5.00%
March 4, 2012	4.50%	6.00%
September 2, 2012	5.50%	7.00%
March 3, 2013	6.00%	8.00%
February 16, 2014	6.50%	8.75%
July 15, 2018	7.00%	10.00%

Retirement Dates

Normal Retirement Date

- The normal retirement date is the first date of the month coincident with or next following the member's 65th birthday

Special Early Retirement Date

- A Member whose age plus service equals or exceeds 80 points may retire early without any reduction for early retirement

Early Retirement Date

- A Member may retire early with a reduced pension at any time during the 10-year period preceding his normal retirement date. The pension payable will be reduced by 0.25% for each month between age 60 and 65 and 0.50% for each month prior to age 60.

Postponed Retirement Date

- A Member may postpone his actual retirement and commencement of pension (with University consent prior to December 12, 2006), but in any event his pension shall commence no later than the 1st of December of the year of attainment of age 71. He will continue to make contributions and benefits under the Plan and will continue to accrue benefits until such postponed retirement date.

Normal Retirement Pension	a) Service prior to July 1, 1979, the greater of: I. 1.0% of 1978 earnings multiplied by years of Plan membership, or II. the benefit accrued to June 30, 1979 PLUS b) Service from July 1, 1979 to December 31, 1985, 40% of Member contributions in each year PLUS c) One-third of the benefits accrued under (a) and (b) above PLUS d) 20% of the benefits accrued under (a), (b) and (c) above PLUS e) 8% of the benefits accrued under (a), (b), (c) and (d) above PLUS f) 20% of the benefits accrued under (a), (b), (c), (d) and (e) above PLUS g) 1.5% of the benefits accrued under (a), (b), (c), (d), (e) and (f) above PLUS h) Service after December 31, 1985, 1.4% of Final Five Year Average Earnings up to the Average Year's Maximum Pensionable Earnings and 2.0% of Final Five Year Average Earnings in excess of the Average Year's Maximum Pensionable Earnings multiplied by years of Credited Service earned after December 31, 1985. Average Year's Maximum Pensionable Earnings is calculated using the average YMPE for the final three year period of a Member's participation in the Plan. The amount by which twice the Member's required contributions with interest exceed the commuted value of the Member's benefit shall be paid to the Member.
Bridge Benefits	A Member who retires early on or after July 1, 2001 is eligible to receive a bridge benefit equal to $12.00 per month per year of credited service accrued to July 1, 2001. Such bridge benefit will be payable commencing on the Member's early retirement date or age 60, if later. The bridge benefit ceases at age 65 or death, if earlier. Such bridge will be reduced by 0.25% per month for each month commencement occurs prior to 65. If the Member has attained 80 points at his early retirement date, the bridge benefit will be unreduced. All pensioners who retired prior to July 1, 2001 and who had not yet attained age 65 at July 1, 2001, will receive a bridge benefit of $12.00 per month per year of credited service accrued to July 1, 1999. The bridge benefit ceases at age 65 or death, if earlier.

Annual Pension Increase	Up until July 1, 2002 pensions in payment were increased from July 1st each year on a pro-rated basis (using the number of months the pensioner has been retired in the twelve months) by the excess over 6% of the rate of return earned on the book value of fixed income securities held by the fund over the previous calendar year, subject to a maximum of that calendar year's rate of increase in the Consumer Price Index. The July 1, 2002 increase was 2.2%. After July 1, 2002, pensions in payment would be increased from January 1st each year on a pro-rated basis (using the number of months the pensioner has been retired in the twelve months) by the excess over 6% of the 5-year average rate of return earned on the market value of the fund, subject to a maximum of the previous calendar year's rate of increase in the Consumer Price Index. There were no increases provided from January 1, 2003 to January 1, 2007. Since January 1, 2007, pensions in payment were increased by 2.88%.
Maximum Pension	The total annual pension payable from the Plan upon retirement, death or termination of employment cannot exceed the lesser of: ▪ 2% of the average of the best three consecutive years of regular annual salary, multiplied by total credited service; and ▪ $2,890.00 or such other maximum permitted under the *Income Tax Act*, multiplied by the member's total credited service.
Death Benefits	**Pre-retirement:** ▪ The death benefit payable is equal to the commuted value of benefits accrued under the Plan. ▪ The amount by which twice the Member's required contributions with interest exceeds the commuted value shall be paid to the Member's spouse or if no spouse exists, to the Member's designated beneficiary. **Post-retirement:** ▪ The normal form of payment is a lifetime pension guaranteed for ten years. However, the member may elect to receive an optional form of pension on an actuarial equivalent basis.
Disability Benefits	If a Member becomes totally and permanently disabled, he shall continue to accrue benefits on the basis of his earnings in the twelve month period preceding the onset of disability. A disabled Member shall not be required to contribute to the Plan.

Termination Benefits	If a Member terminates employment prior to retirement, he may elect to receive one of the following: a) A refund of his required contributions, with Net Interest on the Fund if the Member has not participated in the Plan for at least 2 years. b) A transfer of the commuted value of the Member's pension. c) A deferred pension, payable at Normal Retirement Date, equal to the pension earned to the date of termination. In addition to the benefit payable above, the amount by which twice the Member's required contributions with interest exceeds the commuted value of the Member's benefit shall be paid to the Member. With respect to (b) and (c) above, the transfer must be made to another retirement arrangement or pension plan in the form and manner prescribed by the Canada Revenue Agency and the amounts so transferred must be locked-in to provide retirement benefits commencing no earlier than the Member's early retirement date under the Plan.

APPENDIX G

Employer Certification

With respect to the Report on the Actuarial Valuation for Funding Purposes as at July 1, 2016 of The Contributory Pension Plan for Hourly-Rated Employees of McMaster University Including McMaster Divinity College, I hereby certify that, to the best of my knowledge and belief:

- The valuation reflects the terms of the University's engagement with the actuary described in Section 2 of this report, particularly the requirement to include a margin of 0.25% in the discount rate used to perform the going concern valuation and the University's decisions in regards to determining the solvency funding requirements.

- A copy of the official plan documents and of all amendments made up to July 1, 2016, was provided to the actuary and is reflected appropriately in the summary of plan provisions contained herein.

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

- The membership data provided to the actuary included a complete and accurate description of every person who is entitled to benefits under the terms of the Plan for service up to July 1, 2016.

- All events subsequent to July 1, 2016 that may have an impact on the Plan have been communicated to the actuary.

29/3/17
Date

Signed

ROGER COULDREY
Name
VP ADMINISTRATION

Mercer (Canada) Limited
161 Bay Street, P.O. Box 501
Toronto, Ontario M5J 2S5
+1 416 868 2000