

March 2008

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, 2007

**MERCER**



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

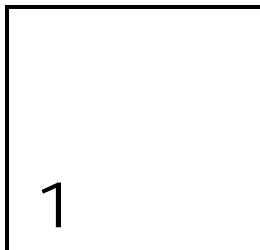
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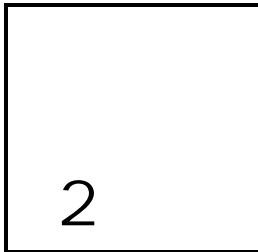
Appendix F: History of Fund Yields



## Summary of Results (\$000)

<b>Going-concern Financial Position</b>	<b>01.07.2007</b>	<b>01.07.2004</b>
Smoothed value of assets	\$32,766	\$25,357
Actuarial liability	\$32,520	\$28,628
Funding surplus (shortfall)	\$246	(\$3,271)
<b>Solvency Financial Position</b>	<b>01.07.2007</b>	<b>01.07.2004</b>
Solvency assets, net of expenses	\$33,567	\$29,191
Solvency liability	\$37,011	\$29,191
Solvency surplus (shortfall)	(\$3,444)	\$0
Transfer ratio	0.91	0.85
<b>Wind-up Financial Position</b>	<b>01.07.2007</b>	<b>01.07.2004</b>
Market value of assets net of expenses	\$33,567	\$25,564
Wind-up liability	\$37,011	\$30,329
Wind-up surplus (shortfall)	(\$3,444)	(\$4,765)

<b>Funding Requirements (annualized)</b>	<b>2007/2008</b>	<b>2004/2005</b>
Total current service cost	\$1,371	\$1,407
Estimated member's required contributions	\$441	\$445
Estimated employer's current service cost	\$930	\$962
Employer's current service cost as a percentage of members' required contributions	211%	216%
Minimum special payments	\$777	\$496
Estimated minimum employer contribution for year	\$1,707	\$1,458
Estimated maximum employer contribution for year	\$4,374	\$5,727



## Introduction

### Report on the Actuarial Valuation as at July 1, 2007

#### **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 as at July 1, 2007. We are pleased to present the results of the valuation.

The purpose of this valuation is to determine:

- the funded status of the plan as at July 1, 2007 on going-concern and solvency bases, and
- the minimum funding requirements from July 1, 2007 to June 30, 2010.

The next actuarial valuation of the plan will be required as at a date not later than July 1, 2010 or as at the date of an earlier amendment to the plan, in accordance with the minimum requirements of the *Pension Benefits Act of Ontario*.

There is a funding surplus of \$246,000, and solvency liabilities exceed solvency assets by \$3,444,000 as at July 1, 2007. As such, the minimum monthly contribution to be remitted to the plan from July 1, 2007 to June 30, 2010 is as follows:

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#### **Monthly Employer Contributions**

For current service: 211% of members' required contributions

Minimum special payments for unfunded liability: \$0

Minimum additional special payments for solvency: \$64,772

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On the basis of the members' estimated required contributions, we have estimated the minimum total employer contribution for the year July 1, 2007 to June 30, 2008 to be \$1,707,000 or \$142,000 per month.

The maximum contribution that McMaster University may make to the plan in 2007/2008 is \$4,374,000 which is comprised of the McMaster University current service cost plus the wind-up shortfall.

The minimum contribution requirements based on this report exceed the minimum contribution requirements recommended in the previous valuation report. Upon filing this report, McMaster University must contribute the excess, if any, of the minimum contribution recommended in this report over contributions actually made in respect of the period following July 1, 2007. This contribution, along with an allowance for interest, is due no later than 60 days following the date this report is filed.

The plan is not fully funded on a wind-up basis. Even if the sponsor contributes in accordance with the funding requirements described in this valuation report, the assets of the plan may be less than the liabilities of the plan upon wind-up.

Emerging experience, including the growth of wind-up liabilities compared to the plan's assets (including future contributions and investment returns), will also affect the wind-up funded position of the plan.

This valuation reflects the provisions of the plan as at July 1, 2007. The plan has been amended since the date of the previous valuation, mainly to reflect name changes of some representative unions and has no impact to the valuation. A summary of the plan provisions is provided in Appendix D.

We have used the same going-concern valuation assumptions and methods as were used for the valuation as at July 1, 2004, except for the following:

- the assumed investment return has been increased from 6.0% per year before and after retirement to 6.25% per year prior to retirement and 6% per year after retirement;
- the assumed mortality rates, both before and after retirement, have been changed from GAM83 to UP94 (projected with mortality improvements to 2015); and
- the maximum pension limits under the *Income Tax Act* introduced by the Federal Budget in February 2005 have been reflected.

These changes have resulted in an increase of \$559,000 in the actuarial liability and of \$15,000 in the employer current service cost.

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

The assumptions used for purposes of this valuation are described in Appendix B. All assumptions made for the purposes of the valuation were reasonable at the time the valuation was prepared.

A new Canadian Institute of Actuaries Standard of Practice for Determining Pension Commuted Values ("CIA Standard") became effective on February 1, 2005. The new CIA Standard changes the assumptions to be 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 new CIA Standard has been reflected in this actuarial valuation.

This report has been prepared on the assumption that all of the assets in the pension fund are available to meet all of the claims on the pension plan. We are not in a position to assess the impact that the Ontario Court of Appeal's decision in *Aegon Canada Inc. and Transamerica Life Canada versus ING Canada Inc.* or similar decisions in other jurisdictions might have on the validity of this assumption.

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.

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

The information contained in this report was prepared for the Pension Committee for its internal use and for filing with Financial Services Commission of Ontario and with the Canada Revenue Agency, in connection with our actuarial valuation of the plan. This report is not intended or necessarily suitable for other purposes.

This report will be filed with the Financial Services Commission of Ontario and with the Canada Revenue Agency.



Respectfully submitted,

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Lorraine Gignac

Fellow of the Society of Actuaries

Fellow of the Canadian Institute of Actuaries

March 5, 2008

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Date

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Karen Tang

Fellow of the Society of Actuaries

Fellow of the Canadian Institute of Actuaries

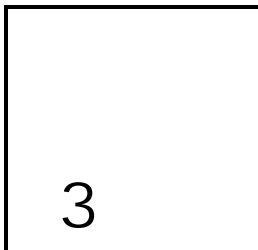
March 5, 2008

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Date

***The Contributory Pension Plan for Hourly-Rated Employees of McMaster University Including McMaster Divinity College***

Registration number with the Financial Services Commission of Ontario and with the Canada Revenue Agency: 0215418



## Financial Position of the Plan

### Valuation Results – Going-concern Basis

When conducting a valuation on a going-concern basis, we determine the relationship between the respective values of assets and accumulated benefits, assuming the plan will be maintained indefinitely.

#### **Financial Position**

The results of the valuation as at July 1, 2007, in comparison with those of the previous valuation as at July 1, 2004, are summarized as follows:

<b>Financial Position – Going-concern Basis (\$000)</b>		
	01.07.2007	01.07.2004
<b>Assets</b>		
Market value of assets (adjusted for in-transit items)	\$33,717	\$25,714
Smoothing adjustment	(\$951)	(\$357)
Smoothed value of assets	\$32,766	\$25,357
<b>Actuarial liability</b>		
Present value of accrued benefits for:		
▪ active members	\$18,682	\$17,049
▪ pensioners and survivors	\$13,501	\$11,171
▪ deferred pensioners	\$337	\$115
▪ inactive status undecided	\$0	\$293
Total liability	\$32,520	\$28,628
Funding surplus (shortfall) (A)	\$246	(\$3,271)
<hr/>		
Present value of existing going-concern unfunded liability special payments (B)	\$2,282	\$0
Going-concern unfunded liability created at this valuation (maximum of 0 and A-B)	\$0	(\$3,271)

### ***Reconciliation of Financial Position***

The plan's financial position, a funding surplus of \$246,000 as at July 1, 2007, is reconciled with its previous position, a funding surplus of \$3,271,000 as at July 1, 2004, as follows:

<b>Reconciliation of Financial Position (\$000)</b>	
Funding surplus (shortfall) as at 01.07.2004	(\$3,271)
Interest on funding surplus (shortfall) at 6.00% per year to 01.07.2007	(\$625)
Net experience gains (losses) over 2004-2007*	\$2,905
Employer's special payments to eliminate the unfunded liability	\$1,624
Impact of changes in assumptions and new ITA maximum pension	(\$559)
Impact of change in valuation methodology for inactive-status undecided members	\$105
Net impact of other elements of gains and losses	\$67
<b>Funding surplus (shortfall) as at 01.07.2007</b>	<b>\$246</b>

\* Net experience gains (losses) are detailed below.

## ***Plan Experience***

The main assumptions are compared with actual experience since the previous valuation as at July 1, 2004:

### **Plan Experience (\$000)**

	Assumption	Actual 2004-2007	Impact Gain (Loss)
Net Investment return	6.0%/year	8.1%/year	\$1,886
Increases in pensionable earnings	4.5%/year	2.5%/year	} \$720
Increases in YMPE	4.0%/year	2.6%/year	
New entrants			(\$230)
Retirements	35.8	42	(\$203)
Terminations of employment	0	36	\$724
Mortality:			
▪ pre-retirement	2.8	4	(\$20)
▪ post-retirement	4	30	\$28
<b>Net experience gains (losses)</b>			<b>\$2,905</b>

## Valuation Results – Solvency Basis

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

We have included the value of all benefits that may be contingent upon the circumstances of the postulated plan wind-up.

### **Financial Position on a Solvency Basis**

The plan's solvency position as at July 1, 2007, in comparison with that of the previous valuation as at July 1, 2004, is determined as follows:

<b>Solvency Position (\$000)</b>		
	01.07.2007	01.07.2004
Market value of assets (adjusted for in-transit items)	\$33,717	\$25,714
Termination expense provision	(\$150)	(\$150)
1. Solvency assets	\$33,567	\$25,564
Solvency asset adjustment:		
Averaging method adjustment	\$0	\$1,495
Present value of special payments for next five years	\$0	\$2,132
2. Adjusted solvency assets	\$33,567	\$29,191
Actuarial liability		
Present value of accrued benefits for:		
▪ active members	\$21,960	\$17,835
▪ pensioners and survivors	\$14,627	\$12,082
▪ deferred pensioners	\$424	\$119
▪ inactive status undecided	\$0	\$293
3. Solvency liabilities	\$37,011	\$30,329
Solvency liability averaging method adjustment	\$0	(\$1,138)
4. Adjusted solvency liability	\$37,011	\$29,191
Solvency excess (deficiency) created as at valuation date (2. - 4.)	(\$3,444)	\$0
Total solvency surplus (shortfall)	(\$3,444)	\$0
Transfer ratio (1. ÷ 3.)	0.91	0.85

### ***Payment of Benefits***

Since the transfer ratio is less than one, the plan administrator should ensure that the monthly special payments are sufficient to meet the requirements of the *Pension Benefits Act of Ontario* to allow for the full payment of benefits. Otherwise, the plan administrator should take the actions prescribed by the *Act*.

### ***Financial Position on a Wind-up Basis***

The plan's hypothetical wind-up position as of July 1, 2007, assuming circumstances producing the maximum wind-up liabilities on the valuation date, is determined as follows:

<b>Wind-up Position (\$000)</b>	
	01.07.2007
Market value of assets (adjusted for in-transit items)	\$33,717
Termination expense provision	(\$150)
Wind-up assets	\$33,567
Present value of accrued benefits for:	
▪ active members	\$21,960
▪ pensioners and survivors	\$14,627
▪ deferred pensioners	\$424
Total wind-up liability	\$37,011
Wind-up surplus (shortfall)	(\$3,444)

### ***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.

## ***Pension Benefit Guarantee Fund (PBGF) Assessment***

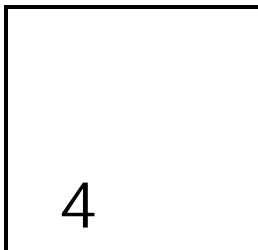
The PBGF assessment is calculated as follows:

\$1 for each Ontario member	\$630
PLUS	
0.5% of PBGF assessment base up to 10% of PBGF liabilities	\$16,470
PLUS	
1.0% of PBGF assessment base up to between 10% and 20% of PBGF liabilities	\$0
PLUS	
1.5% of PBGF assessment base over 20% of PBGF liabilities	\$0
PLUS	
2.0% of special PBGF assessment base	\$0
<b>PBGF assessment (taking into account the limit per member)</b>	<b>\$17,100</b>

The PBGF assessment base and liabilities are derived as follows:

### **PBGF Assessment Base and PBGF Liabilities (\$000)**

PBGF liabilities	\$37,011	(a)
Total solvency liabilities	\$37,011	(b)
Ontario asset ratio	100.0%	(c) = (a) ÷ (b)
Market value of assets	\$33,717	(d)
Ontario portion of the fund	\$33,717	(e) = (c) x (d)
<b>PBGF assessment base</b>	<b>\$3,294</b>	<b>(f) = (a) - (e)</b>



## Funding Requirements

### Current Service Cost

The estimated value of the benefits that will accrue on behalf of the active members for the year July 1, 2007 to June 30, 2008, in comparison with the corresponding value determined in the previous valuation as at July 1, 2004, is summarized below:

<b>Employer's Current Service Cost (\$000)</b>		
	2007/2008	2004/2005
Total current service cost	\$1,371	\$1,407
Estimated members' required contributions	\$441	\$445
Estimated employer's current service cost	\$930	\$962
Employer's current service cost expressed as a percentage of members' required contributions	211%	216%

An analysis of the changes in the employer's current service cost follows:

<b>Changes in Employer's Current Service Cost</b>	
Employer's current service cost as at 01.07.2004	216%
Demographic changes	(9%)
Changes in assumptions	4%
Employer's current service cost as at 01.07.2007	211%



## Special Payments

### **Going-concern Basis**

The present value, as at July 1, 2007, of the monthly special payments that were determined in the previous valuation, is as follows:

#### **Present Value of Monthly Special Payments Determined as at 01.07.2004**

Type of Deficit	Effective Date	Current Special Payment	Last Payment	Present Value of Remaining Payments as at 01.07.2007
Going Concern	July 1, 2004	\$41,286	November 30, 2012	\$2,282,000

Due to the experience gain arising since the previous valuation, there is a funding surplus as at July 1, 2007. As such, the special payments that were determined in the previous valuation can be eliminated.

### **Solvency Basis**

No solvency special payments existed in the previous valuation. In accordance with the *Pension Benefits Act of Ontario*, each solvency deficiency must be eliminated by special payments within five years of the respective effective date. As such, special payments have been established at \$64,772 per month until June 30, 2012 to eliminate the solvency deficiency of \$3,444,000.

### **Total Special Payments**

The following minimum monthly special payments must be made to the plan to eliminate the solvency deficiency as at July 1, 2007, within the periods prescribed by the *Pension Benefits Act of Ontario*.

#### **Minimum Monthly Special Payments**

Type of Deficit	Effective Date	Special Payment	Last Payment
Solvency	July 1, 2007	\$64,772	June 30, 2012
Total		\$64,772	

## Employer Contributions

There is no unfunded liability, and solvency liabilities exceed solvency assets by \$3,444,000 so special payments are required for solvency purposes as at July 1, 2007.

As such, we recommend that McMaster University make monthly contributions to the plan from July 1, 2007 to June 30, 2010, as follows:

### ***Minimum Funding Requirements***

The minimum monthly required contributions from July 1, 2007 to June 30, 2010 are as follows:

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#### **Monthly Employer Contributions**

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For current service: 211% of members' required contributions

Minimum special payments for unfunded liability: \$0

Minimum additional special payments for solvency: \$64,772

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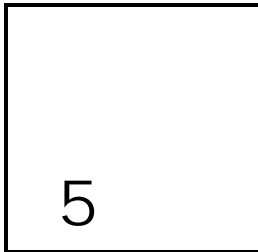
On the basis of the members' estimated required contributions, we have estimated the minimum total employer contribution for the year July 1, 2007 to June 30, 2008 to be \$1,707,000 or \$142,000 per month.

Contributions for current service must be made within 30 days following the month to which they apply. Special payments to eliminate an unfunded liability or solvency deficiency must be made in the month to which they apply.

The minimum contribution requirements based on this report exceed the minimum contribution requirements recommended in the previous valuation report. Upon filing this report, McMaster University must contribute the excess, if any, of the minimum contribution recommended in this report over contributions actually made in respect of the period following July 1, 2007. This contribution, along with an allowance for interest, is due no later than 60 days following the date this report is filed.

### ***Maximum Eligible Contributions***

The maximum eligible employer contribution is equal to the McMaster University current service cost plus the wind-up deficiency. We have estimated the maximum eligible annual contribution for the year July 1, 2007 to June 30, 2008 to be \$4,374,000 as at July 1, 2007.



## Actuarial Opinion

**With respect to the Actuarial Valuation as at July 1, 2007  
of The Contributory Pension Plan for Hourly-Rated Employees of McMaster  
University Including McMaster Divinity College  
FSCO Registration 0215418  
Canada Revenue Agency 0215418**

Based on the results of this valuation, we hereby certify that, as at July 1, 2007:

- The employer's current service cost for the year July 1, 2007 to June 30, 2008 and subsequent years, up to the next actuarial valuation should be calculated as 211% of members' required contributions.
- The employer's current service cost for the year July 1, 2007 to June 30, 2008 is estimated to be \$930,000.
- There is a funding surplus of \$246,000 as at July 1, 2007.
- The plan would be fully funded on a solvency basis if its assets were augmented by \$3,444,000. In order to comply with the provisions of the *Pension Benefits Act of Ontario*, the solvency deficiency must be liquidated by monthly special payments at least equal to the amounts indicated, and for the periods set forth, below:

### Monthly Solvency Special Payments

Type of Deficit	Effective Date	Special Payment	Last Payment
Solvency	July 1, 2007	\$64,772	June 30, 2012

- The solvency liabilities used to determine the solvency status of the plan do not exclude any benefit provided under the plan.

- We have included in the solvency liabilities the value of all benefits that may be contingent upon the circumstances of the postulated plan wind-up.
- The Pension Benefits Guarantee Fund annual assessment under Section 37 of the Regulations to the *Pension Benefits Act of Ontario* for the Plan Year ending June 30, 2007 is \$17,100 payable no later than March 31, 2008. The PBGF assessment base is \$3,294,000. The PBGF liabilities are \$37,011,000.
- The transfer ratio of the plan is 0.91. The Prior Year Credit Balance on July 1, 2007 is \$0.
- In our opinion,
  - the data on which the valuation is based are sufficient and reliable for the purposes of the valuation,
  - the assumptions are, in aggregate, appropriate for the purposes of determining the funded status of the plan as at July 1, 2007 on going-concern and solvency bases, and determining the minimum funding requirements, and
  - the methods employed in the valuation are appropriate for the purposes of determining the funded status of the plan as at July 1, 2007 on going-concern and solvency bases, and determining the minimum funding requirements.
- This report has been prepared, and our opinions given, in accordance with accepted actuarial practice.
- All assumptions made for the purposes of the valuation were reasonable at the time the valuation was prepared.

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Lorraine Gignac  
Fellow of the Society of Actuaries  
Fellow of the Canadian Institute of Actuaries

March 5, 2008

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Date

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Karen Tang  
Fellow of the Society of Actuaries  
Fellow of the Canadian Institute of Actuaries

March 5, 2008

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Date

Appendix A

## Plan Assets

### Sources of Plan Asset Data

The pension fund is held in trust by CIBC Mellon and is invested in accordance with the Plan's investment policy statement.

We have relied upon fund statements prepared by CIBC Mellon, for the period from July 1, 2004 to July 1, 2007.

### Reconciliation of Plan Assets

The pension fund transactions for the period from July 1, 2004 to July 1, 2007 are summarized as follows:

<b>Reconciliation of Plan Assets (Market Value - \$000)</b>			
	2004/2005	2005/2006	2006/2007
As at July 1	\$25,769	\$28,972	\$30,144
PLUS			
Members' contributions	\$416	\$411	\$405
Company's contributions	\$1,392	\$1,481	\$1,445
Investment income	\$984	\$976	\$1,138
Net capital gains (losses)	\$2,103	\$57	\$2,696
	\$4,895	\$2,925	\$5,684
LESS			
Pensions paid	\$1,243	\$1,362	\$1,430
Lump-sum refunds	\$232	\$229	\$207
Administration fees	\$217	\$162	\$153
	\$1,692	\$1,753	\$1,790
As at June 30	\$28,972	\$30,144	\$34,038

This asset value is adjusted to reflect in-transit contributions of \$145,000, and in-transit benefit payments and transfers of \$466,000. The resulting market value is \$33,717,000.

We have tested the pensions paid, the lump-sum refunds 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 adopted a statement of investment policy and objectives. This policy is intended to provide guidelines for the manager(s) as to the level of risk which is commensurate with the plan's investment objectives. A significant component of this investment policy is the asset mix.

The constraints on the asset mix, and the actual asset mix as at July 1, 2007, are provided for information purposes:

### Distribution of the Market Value of the Fund by Asset Class

	Investment Policy			Actual Asset Mix as at 01.07.2007
	Minimum	Target	Maximum	
Canadian equities	20%	30%	40%	35%
US equities	10%	15%	20%	14%
Non-North American equities	5%	10%	15%	12%
Bonds	30%	45%	60%	39%
Cash and cash equivalents	0%	0%	10%	0%
		100%		100%

### Performance of Fund Assets

The performance of fund assets, net of expenses, from July 1, 2004 to July 1, 2007 as per our calculations (which assume that the next cash flow occurred in the middle of each year), and the smoothing effect of the asset valuation method (smoothed market value as described in Appendix B), are show below:

	2004/2005	2005/2006	2006/2007
Market Value	11.1%	3.0%	12.2%
Actuarial Value	7.3%	8.6%	8.5%

The average return on the actuarial value, net of expenses, since the last valuation at July 1, 2004 was 8.1% per year. This rate exceeds the assumed investment return of 6% by 2.1% per year.

A history of fund yields is set out in Appendix F.

Appendix B

## Actuarial Methods and Assumptions

### Actuarial Valuation Methods – Going-concern Basis

#### **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 and 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, determined as at July 1, 2007 under the adjusted market value method, is \$33,087,000.

This value was derived as follows:

	<b>(in \$000)</b>		
	2004/2005	2005/2006	2006/2007
Market value of assets at July 1 <sup>st</sup>	\$25,769	\$28,972	\$30,144
Payment into Plan	\$1,808	\$1,892	\$1,851
Payment out of Plan	(\$1,475)	(\$1,591)	(\$1,637)
Expected interest	\$1,556	\$1,747	\$1,816
Investment experience gains/(losses)	\$1,314	(\$876)	\$1,864
Market value of assets at June 30 <sup>th</sup>	\$28,972	\$30,144	\$34,038



**Smoothed Value of Assets as at 01.07.2007**

Market value of assets			\$34,038,000
LESS			
Investment experience			
gains/(losses)			
	2006/2007:	\$1,864,000 x 66.67% =	\$1,243,000
	2005/2006:	(\$876,000) x 33.33% =	(\$292,000)
			<u>\$951,000</u>
Smoothed value of assets			<u>\$33,087,000</u>

This smoothed asset value is adjusted to reflect in-transit contributions of \$145,000, and in-transit benefit payments and transfers of \$466,000. The resulting smoothed value of asset is \$32,766,000.

## ***Valuation of Actuarial Liabilities***

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 actuarial present value of benefits accrued in respect of service prior to the valuation date, including ancillary benefits, based on projected final average earnings. This is referred to as the *actuarial liability*. For each individual plan member, 2 times the accumulated contributions with interest are established as a minimum actuarial liability.

The *funding surplus* or *funding shortfall*, as the case may be, is the difference between the smoothed value of assets and the actuarial liability. An unfunded liability will be amortized over no more than 15 years through special payments as required under the *Pension Benefits Act of Ontario*. A funding surplus 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.

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

When actuarial liabilities on a solvency basis exceed actuarial liabilities on a going-concern basis and the plan has a solvency deficiency, as are both true in this valuation, contribution requirements will be largely determined by the solvency funded position. This has several implications:

- Special payments are required to amortize solvency deficiencies over a maximum of 5 years; and
- During the amortization period the plan is not expected to be 100% solvent.

In addition, the growth in solvency liabilities resulting from the additional accrual of benefits and development of the plan membership may be different than the growth of plan assets including future contributions and investment returns. This may result in further losses being revealed in future solvency valuations.

## ***Current Service Cost***

The *current service cost* is the actuarial present value of projected benefits to be paid under the plan with respect to service during the year following the valuation date.

The 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 of the group remains constant.

### ***Employer's Contribution***

Accordingly, the employer's contributions for this purpose are determined as follows:

<b>Employer's Contributions</b>	
With a funding surplus	With an unfunded liability
Current service cost	Current service cost
MINUS	PLUS
Any funding surplus applied to cover the employer's current service cost	Payments to amortize any unfunded liability

### **Actuarial Assumptions – Going-concern Basis**

The actuarial value of benefits 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.

In this valuation, we have used the same assumptions as in the previous valuation except as noted. Emerging experience will result in gains or losses that will be revealed and considered in future actuarial valuations. For this valuation, we have used the following assumptions.

### ***Economic Assumptions***

#### ***Investment Return***

We have assumed that the investment return on the smoothed value of the fund will average 6.25% per year over the long term. We have based this assumption on an expected long-term return on the pension fund less an allowance for investment and administrative expenses and less a margin for adverse deviations, as described below.

We have assumed a gross rate of return of 7.74% consistent with market conditions applicable on the valuation date based on an expected long-term return on the pension fund determined for the target asset mix specified in the plan's investment policy. We have allowed for investment and administrative expenses of 0.5% per year. The margin for adverse deviations is 0.99% per year.

In our previous valuation, we had assumed that the investment return to be 6% per year.

### *Expenses*

The assumed Investment Return reflects an implicit provision for expenses.

### *Increases in 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, 2007 and assumed that such pensionable earnings will increase at 4.5% per year.

This is based on:

- an assumed inflation rate of 2.4% per year,
- an assumed productivity component of 1.1% per year, and
- an assumed merit and promotional increases component of 1.0% per year.

### *Increases in the YMPE*

Since the benefits provided by the plan depend on the final average Year's Maximum Pensionable Earnings (YMPE) under the Canada Pension Plan, it is necessary to make an assumption about increases in the YMPE for this valuation. We have assumed that the YMPE will increase at the rate of 4% per year from its 2007 level of \$43,700.

### *Increases in the Maximum Pension Permitted under the Income Tax Act*

The *Income Tax Act* stipulates that the maximum pension that can be provided under a registered pension plan will be increased, starting in 2010, in accordance with general increases in the average wage.

For this valuation, we have assumed that the maximum pension payable under the plan will increase as specified in the *Income Tax Act* from \$2,222.22 in 2007, to \$2,333.33 in 2008 and \$2,444.44 in 2009, and will increase starting in 2010 at the rate of 4% per year.

In our previous valuation, we had assumed that the maximum pension limit would be \$1,833.33 in 2004, \$2,000.00 in 2005, increasing starting in 2006 at the rate of 4%.

### ***Indexation of Pensions in Payment***

Pensions in payment are increased each year according to the indexing provisions of the plan. The increase in pension is equal to the excess of the 5-year average actual fund rate of return over 6%, subject to a cap of the change in CPI for the year. Since our valuation is based on an assumed investment return of 6.25% per year, the assumed post-retirement pension indexing in future is 0.25% per annum. The value of post-retirement indexing is included in the liabilities for all members.

### ***Interest Credited on Employee-required Contributions***

For this valuation, we have assumed that the interest rate to be credited on employee-required contributions will represent, on average, 6.25% per annum, over the long term (6.0% per annum used in the last valuation).

### ***Demographic Assumptions***

#### ***Retirement Age***

We have assumed that 20% of those eligible to retire under the "Rule of 80" would do so when first eligible with the remainder of the members retiring at age 64.

#### ***Termination of Employment***

No allowance has been made for termination of employment before retirement.

#### ***Mortality***

The actuarial value of the pension depends on the life expectancy of the member. We have assumed mortality rates, both before and after retirement, in accordance with the Uninsured Pensioner Mortality Table (UP1994) with mortality projected to 2015. According to this table, the life expectancy at age 65 is 19.0 years for males and 21.6 years for females.

In the previous valuation we have assumed mortality rates before and after retirement in accordance with the Group Annuity Mortality (GAM) Table for 1983. According to this table, the life expectancy at age 65 is 16.7 years for males and 21.3 years for females.

#### ***Disability***

We have made no allowance for projected benefits payable on disability retirement.

## Actuarial Valuation Methods and Assumptions – Solvency and Impact of Plan Wind-up

We have used the market value of the plan's assets in our valuation of the plan for solvency purposes.

To determine the solvency actuarial liability, 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. No benefits payable on plan wind-up were excluded from our calculations.

We have considered that members under 55 years of age on that date would be entitled to a deferred pension payable from age 65 or such earlier age for which plan eligibility requirements have been satisfied at July 1, 2007. Members aged 55 and over are considered to be entitled to an immediate pension, reduced in accordance with the plan rules. We have also considered that members whose age plus years of service equal at least 55 at July 1, 2007 would be entitled to a deferred pension payable from the age that would produce the greatest value if employment were to have continued for the purpose of determining eligibility for early retirement benefits. For each individual plan member, twice the accumulated contributions with interest are established as a minimum actuarial liability. Benefits are assumed to be settled through a lump sum transfer for active members under age 55. The value of the benefits accrued on July 1, 2007, for such members is based on the assumptions described in Section 3800 – *Pension Commuted Values* of the Canadian Institute of Actuaries Standards of Practice applicable for July 1, 2007 for benefits expected to be settled through transfer in accordance with relevant portability requirements.

Benefits are assumed to be settled through the purchase of annuities for active members over 55 years old and all inactive members. The value of the benefits accrued on July 1, 2007, for such members are based on an estimate of the cost of settlement through purchase of annuities.

Assumptions are as follows:

### Actuarial Assumptions

---

Mortality rates:	UP94 projected to 2015 (blending 50% / 50% male/female rates for benefits to be settled through lump sum transfer)
Interest rates for benefits to be settled through lump sum transfer:	5.0% per year
Interest rates for benefits to be settled through annuity purchase:	4.96% per year
Final average earnings:	Based on actual pensionable earnings over the averaging period
Maximum pension limit:	\$2,222.22 per year of service
Termination expenses:	\$150,000

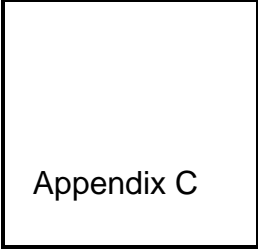
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In a solvency valuation, the accrued benefits are based on the member's final average earnings on the valuation date; therefore, no salary projection is used. Also the employment of each member is assumed to have terminated on the valuation date, therefore, no assumption is required for future rates of termination of employment.

The provision for termination expenses payable from the plan's assets is in respect of actuarial, administration and legal expenses that would be incurred in terminating the plan. Also included in the provision are transaction fees related to the liquidation of the plan's assets and any reduction in the value of the plan's equity assets resulting from this liquidation.

Because the settlement of 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 the hypothetical wind-up being contested.

In determining the provision for termination expenses payable from the plan's assets, we have assumed that the plan sponsor would be solvent on the wind-up date.



Appendix C

## Membership Data

### Analysis of Membership Data

The actuarial valuation is based on membership data as at July 1, 2007, 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.



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

### Membership Data

	01.07.2007			01.07.2004		
	Males	Females	Total	Males	Females	Total
<b>Active Members</b>						
Number	169	168	337	171	193	364
Total salary	\$7,330,149	\$5,702,320	\$13,032,469	\$6,885,861	\$6,168,968	\$13,054,829
Average salary	\$43,374	\$33,942	\$38,672	\$40,268	\$31,964	\$35,865
Average years of pensionable service	11.6	9.9	10.8	11.0	9.0	10.0
Average age	47.6	48.2	47.9	46.6	47.9	47.2
<b>Deferred Pensioners</b>						
Number	25	17	42	7	5	12
Total annual pension	\$21,015	\$44,476	\$65,491	\$9,874	\$8,929	\$18,803
Average annual pension	\$841	\$2,616	\$1,559	\$1,411	\$1,786	\$1,567
Average age	42.6	49.9	45.5	50.0	49.0	49.5
<b>Pensioners and Survivors</b>						
Number	83	168	251	86	148	234
Total annual basic pension	\$527,469	\$823,414	\$1,350,883	\$488,958	\$670,308	\$1,159,266
Average annual basic pension	\$6,355	\$4,901	\$5,382	\$5,686	\$4,529	\$4,954
Average age	74.2	73.9	74.0	74.0	73.6	73.8

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

### Reconciliation of Membership

	Actives	Inactive Status Undecided	Deferred Vested	Pensioners and Beneficiaries	Total
<b>Total at 01.07.2004</b>	364	25	12	234	635
New entrants	54				54
Terminations:					
▪ transfers/refunds	(27)	(2)			(29)
▪ deferred pensions	(9)	(22)	31		0
Deaths	(4)		1	(30)	(33)
Retirements	(38)	(1)	(3)	42	0
Beneficiary				5	5
Transfer to Salaried Plan	(3)				(3)
Data correction			1		1
<b>Total at 01.07.2007</b>	337	0	42	251	630

The distribution of the active members by age and pensionable service as at July 1, 2007, is summarized as follows:

**Distribution of Active Members  
By Age Group and Pensionable Service as at 01.07.2007**

Age	Years of Pensionable Service								Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35+	
Under 20									
20 - 24	2 *								2 *
25 - 29	10 33,850	1 *							11 33,870
30 - 34	14 39,306		1 *						15 39,071
35 - 39	17 39,655	11 35,925	5 40,818	2 *					35 38,330
40 - 44	28 40,115	9 34,260	6 37,152	10 40,741	1 *				54 38,874
45 - 49	19 35,466	14 36,278	10 37,440	14 36,944	8 43,001				65 37,190
50 - 54	17 40,824	13 35,325	9 37,865	16 38,873	5 49,005	7 43,906			67 39,826
55 - 59	5 43,489	9 36,744	6 34,875	15 38,716	9 39,661	5 40,843	5 41,288		54 38,995
60 - 64	1 *	4 40,014	9 38,203	6 44,751	6 41,770	2 *	2 *	2 *	32 41,069
65 +		1 *		1 *					2 *
<b>Total</b>	113 38,629	62 35,877	46 37,631	64 39,108	29 42,548	14 41,532	7 43,267	2 *	337 38,672

\* not shown to protect member confidentiality.

The distribution of the inactive members by age as at July 1, 2007, is summarized as follows:

**Distribution of Inactive Members  
 By Age Group as at 01.07.2007**

Age	Deferred Pensioners		Pensioners and Survivors	
	Number	Average Pension	Number	Average Pension
25 - 29	2	*		
30 - 34	4	\$774		
35 - 39	8	\$1,361		
40 - 44	10	\$654		
45 - 49	6	\$3,490		
50 - 54	3	\$1,356	1	*
55 - 59	4	\$2,124	8	\$6,155
60 - 64	5	\$2,256	35	\$7,873
65 - 69			54	\$6,818
70 - 74			45	\$4,610
75 - 79			45	\$4,821
80 - 84			43	\$3,583
85 - 89			17	\$4,025
90 - 94			2	*
95 +			1	*
<b>Total</b>	<b>42</b>	<b>\$1,559</b>	<b>251</b>	<b>\$5,382</b>

\* not shown to protect member confidentiality.

Appendix D

## Summary of Plan Provisions

### Introduction

*The Contributory Pension Plan for Hourly-Rated Employees of McMaster University Including McMaster Divinity College* was established July 1, 1962 and was revised and renamed effective July 1, 1979. It was subsequently revised as of January 1, 1986, July 1, 1989, January 1, 1992, July 1, 1999, July 1, 2001, December 1, 2004. It was most recently amended effective December 12, 2006.

This valuation is based on the plan provisions in effect on July 1, 2007. The following is a summary of the plan's main provisions in effect on July 1, 2007. It is not intended as a complete description of the plan.

### Eligibility for Membership

Each full-time Employee may elect to become a Member following six months of Continuous Service and shall become a Member on the July 1st following six months of Continuous Service, except for "Cleaners" hired after October 13, 2005 and members of the casual bargaining unit are not permitted to join the Plan.

### Contributions

Members are required to contribute 3.5% of annual earnings up to the Year's Maximum Pensionable Earnings and 5% of annual earnings in excess of the Year's Maximum Pensionable Earnings. The University will pay the balance required to provide for the cost of benefits. The minimum University contribution each year is an amount equal to the contributions made by the Plan Members during the year.

## Retirement

### ***Normal Retirement***

The normal retirement date is the first date of the month coincident with or next following the member's 65<sup>th</sup> birthday.

### ***Special Early Retirement***

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

### ***Early Retirement***

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***

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 69. He will continue to make contributions and benefits under the Plan and will continue to accrue benefits until such postponed retirement date.

## Retirement Benefits

### ***Normal Retirement***

The following benefits will be payable at normal retirement:

(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 will 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.

## 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
- \$2,222.22 or such other maximum permitted under the *Income Tax Act*, multiplied by the member's total credited service.

## Survivor Benefits

### ***Death Before 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.

### ***Death After 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.

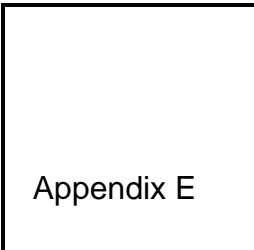
## Termination Benefits

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.



## Employer Certification

With respect to the report on the actuarial valuation of *The Contributory Pension Plan for Hourly-Rated Employees of McMaster University Including McMaster Divinity College*, as at July 1, 2007, I hereby certify that, to the best of my knowledge and belief:

- a copy of the official plan documents and of all amendments made up to July 1, 2007, were provided to the actuary,
- 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, 2007, and
- all events subsequent to July 1, 2007 that may have an impact on the results of the valuation have been communicated to the actuary.

\_\_\_\_\_

Date

\_\_\_\_\_

Signed

\_\_\_\_\_

Name

Appendix F

## History of Fund Yields

The following table summarizes the Market Value and Actuarial Value yield on the fund for the last 9 years. The rates are net of expenses paid from the fund.

Year Starting July 1	Fund Rate of Return	
	Market Value %	Actuarial Value %
95-96	9.36	7.09
96-97	21.99	14.93
97-98	13.28	19.56
98-99	4.38	14.92
99-00	12.85	9.93
00-01	0.33	5.92
01-02	(2.55)	3.26
02-03	(2.75)	(1.83)
03-04	12.88	1.94
04-05	11.07	7.29
05-06	2.99	8.57
06-07	12.16	8.50

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