



Actuarial Valuation as at January 1, 2022 for the University Pension Plan Ontario

Regulatory Registration Number: 1357243

September 2022

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Executive Summary

The January 1, 2022 actuarial valuation for the UPP has been prepared for purposes of establishing a funding regime in accordance with legislative requirements until the next actuarial valuation is performed. The most recent actuarial valuation of the UPP prepared for regulatory purposes was as of the conversion date of July 1, 2021, reflecting the initial transfer of assets and liabilities from the pension plans of the three founding universities into the UPP effective as of July 1, 2021. Since the plan year for the UPP is a calendar year, and since the Funding Policy of the UPP requires annual valuations, the January 1, 2022 actuarial valuation aligns the valuations with the plan year. The Joint Sponsors of the UPP have directed the UPP to file this actuarial valuation with the regulatory authorities. The next actuarial valuation for purposes of developing the funding requirements should be performed no later than January 1, 2025.

This section provides an overview of the important results and the key valuation assumptions which have had a bearing on these results. For comparative purposes, the same information is provided as of July 1, 2021.

Summary of Principal Results

Financial Position (000's)

	January 1, 2022	July 1, 2021
Going Concern		
Assets	\$ 12,071,991	\$ 11,230,192
Liabilities	<u>10,949,325</u>	<u>10,151,124</u>
Funding excess/(shortfall)	\$ 1,122,666	\$ 1,079,068
Funded ratio	1.10	1.11
Solvency		
Assets ¹	\$ 12,061,991	\$ 11,220,192
Liabilities	<u>12,744,656</u>	<u>12,168,872</u>
Surplus/(deficiency) ²	\$ (682,665)	\$ (948,680)
Solvency ratio	0.95	0.92
Hypothetical Wind Up		
Assets ¹	\$ 12,061,991	\$ 11,220,192
Liabilities	<u>16,166,230</u>	<u>15,284,518</u>
Surplus/(deficiency)	\$ (4,104,239)	\$ (4,064,326)
Transfer ratio	0.75	0.73

¹ Net of wind-up expenses

² Specified to be 0 pursuant to subsection 1.3.1(3) of the Regulations to the *Pension Benefits Act* (Ontario)

Current Service Cost (000's)

	January 1, 2022	July 1, 2021
Total current service cost	\$ 406,316	\$ 368,647
As a % of capped pensionable earnings	20.17%	19.62%
Member and matching employer contributions	\$ 407,525	\$ 381,476
As a % of capped pensionable earnings	20.23%	20.30%
Capped pensionable earnings ¹	\$ 2,014,458	\$ 1,878,949

Membership Data

	January 1, 2022	July 1, 2021
Active, leave and disabled members	20,548	19,818
Pensioners and beneficiaries	12,276	11,935
Deferred vested members	5,599	5,331
Other members	144	44
Total	38,567	37,128

¹ Pensionable earnings capped for contribution purposes at \$191,400 in 2022; \$181,700 in 2021

Key Assumptions

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

Going Concern	January 1, 2022	July 1, 2021
Discount rate	5.45% per year	5.60% per year
Inflation rate	2.00% per year	Same
Cost-of-living adjustment	1.50% per year (75% of CPI)	Same
YMPE and <i>ITA</i> maximum pension	2.75% per year	Same
Pensionable earnings	4.00% per year	Same
Mortality table	95% of 2014 Canadian Public Sector Pensioners' Mortality Table, with mortality improvement scale MI-2017 from 2014	Same
Retirement rates	Age-related table	Same
Termination rates	Age-related table	Same
Termination-option election	40% lump-sum value 60% deferred pension	50% lump-sum value 50% deferred pension
Proportion with spouse for non-retired members	85% for male members with spouse four years younger 75% for female members with spouse two years older	Same

Section 1: Introduction

Purpose and Terms of Engagement

We have been engaged by the Board of Trustees (the “Board”), as legal administrator of the UPP, to conduct an actuarial valuation of the UPP as of January 1, 2022. Specifically, the purposes of the valuation are to:

- Determine the financial position of the UPP on a going concern basis as of January 1, 2022;
- Determine the financial position of the UPP as of January 1, 2022 on a solvency and hypothetical wind up basis;
- Measure the sufficiency of the member and participating employer contribution rates under Sections 5.01 through 5.04 of the UPP plan text; and
- Provide the necessary actuarial certification required under the *Pension Benefits Act* (Ontario) (the “*Act*”) and the *Income Tax Act* (the “*ITA*”).

The intended users of this report are the Board, the UPP Joint Sponsors, the Financial Services Regulatory Authority of Ontario (“FSRA”) and the Canada Revenue Agency (“CRA”)

The results of this report may be used for accounting purposes subject to the approval of the Board, but may not be appropriate for any other purposes not listed above.

The next required valuation to be filed with the regulatory authorities will be the actuarial valuation as at January 1, 2025.

Board Information and Inputs

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

- The UPP qualifies as a jointly sponsored pension plan within the meaning of the *Act* and is listed under subsection 1.3.1(3) of Regulation 909 under the *Act*;
- A copy of the previous actuarial report of the UPP as at July 1, 2021, the conversion date of the UPP;
- A copy of the Cost Certificate as of January 1, 2022 in connection with the transfer of assets and liabilities from The Contributory Pension Plan for TUFA Employees of Trent University to the UPP effective January 1, 2022 pursuant to s. 80.4 of the *Act*.
- Member data compiled as of January 1, 2022 by the UPP;
- Asset data provided by the UPP including the audited financial statements;
- A copy of the UPP plan text filed for registration with the regulatory authorities;
- A copy of the Statement of the Investment Policies and Procedures of the UPP, effective January 1, 2022; and
- A copy of the Funding Policy for the UPP adopted by the Joint Sponsors in December 2019 and as amended effective January 1, 2022, and filed with the regulatory authorities.

Summary of Changes Since the Last Valuation

The last actuarial valuation was performed as of July 1, 2021. Since the time of the last valuation, we note the following events have occurred:

- Effective January 1, 2022, the assets and liabilities of The Contributory Pension Plan for TUFA Employees of Trent University (“TUFA Pension Plan”) were transferred to the UPP pursuant to s. 80.4 of the *Act*. The actual date of transfer of the assets in-kind was also January 1, 2022. Effective January 1, 2022, members of the TUFA Pension Plan became members of the UPP and began accruing pension benefits under the provisions of the UPP in the case of active and disabled members and began receiving their pensions from the UPP in the case of pensioners and beneficiaries.
- Effective January 1, 2022, employees of the University of Toronto Faculty Association, employees of the University of Guelph Faculty Association, and employees of the UPP began accruing benefits under the UPP for service after January 1, 2022.

Subsequent Events

As of the date of this report, we have not been made aware of any subsequent events which would have an effect on the results of this valuation. However, the following points should be noted in this regard:

- Actual experience deviating from expected after January 1, 2022 will result in gains or losses which will be reflected in the next actuarial valuation report.
- The Canadian Institute of Actuaries has amended the Standards of Practice related to the computation of commuted values effective February 1, 2022. The amended Standards of Practice revise the methodology for determining commuted values for indexed pension plans by changing the determination of the rate of inflation. As this change is not retroactive, it does not impact the January 1, 2022 actuarial valuation of the UPP.
- To the best of our knowledge, the results contained in this report are based on the regulatory and legal environment in effect at the date of this report and do not take into consideration any potential changes that may be currently under review. To the extent that actual changes in the regulatory and legal environment transpire, any financial impact on the UPP as a result of such changes will be reflected in future valuations.

Section 2: Going Concern Valuation Results

Going Concern Valuation

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

The selection of the applicable going concern actuarial assumptions and methods reflects the Plan's funding objectives, the Funding Policy of the UPP, actuarial standards of practice, and pension standards. The actuarial assumptions and methods are described in Appendix C of this report.

On the basis of the actuarial assumptions and methods, and the UPP provisions, membership data and asset information also described in the Appendices, the following sections show the going concern financial position of the Plan as at January 1, 2022, and the going concern current service cost and required member and matching employer contributions. The results as of July 1, 2021 are also shown for comparison purposes.

Going Concern Financial Position (000's)

January 1, 2022	Pre-Conversion Date Benefits	Post-Conversion Date Benefits	Total
Market Value of Assets¹ (adjusted for receivables/payables)	\$ 11,873,147	\$ 198,844	\$ 12,071,991
Going Concern Liabilities			
Active, leave and disabled members			
Defined benefit liabilities	\$ 4,017,396	\$ 189,477	\$ 4,206,873
Money purchase liabilities	896,180	0	896,180
Deferred vested members			
Defined benefit liabilities	335,567	965	336,532
Money purchase liabilities	188,367	0	188,367
Pensioners and beneficiaries	5,311,778	1,932	5,313,710
Other members	<u>7,585</u>	<u>78</u>	<u>7,663</u>
Total Liabilities	\$ 10,756,873	\$ 192,452	\$ 10,949,325
Funding Excess/(Shortfall)	\$ 1,116,274	\$ 6,392	\$ 1,122,666

¹ Assets are notionally tracked by UPP for going concern valuation purposes between pre-conversion date benefits and post-conversion date benefits

July 1, 2021	Pre-Conversion Date Benefits	Post-Conversion Date Benefits	Total
Market Value of Assets (adjusted for receivables/payables)	\$ 11,230,192	\$ 0	\$ 11,230,192
Going Concern Liabilities			
Active, leave and disabled members			
Defined benefit liabilities	\$ 3,811,321	\$ 0	\$ 3,811,321
Money purchase liabilities	919,300	0	919,300
Deferred vested members			
Defined benefit liabilities	289,267	0	289,267
Money purchase liabilities	184,780	0	184,780
Pensioners and beneficiaries	4,945,950	0	4,945,950
Other members	506	0	506
Total Liabilities	\$ 10,151,124	\$ 0	\$ 10,151,124
Funding Excess/(Shortfall)	\$ 1,079,068	\$ 0	\$ 1,079,068

Going Concern Current Service Cost (000's)

Under Sections 5.01 through 5.04 of the UPP plan text, members and participating employers each contribute 9.20% of Pensionable Earnings up to the Year's Maximum Pensionable Earnings (YMPE) plus 11.50% of Pensionable Earnings above the YMPE up to the Maximum Pensionable Earnings for Contributions (capped pensionable earnings of \$191,400 in 2022). The total current service cost and member and matching employer contributions shown below are for the year following the valuation date for active and disabled members and members on leave who are accruing benefits.

	January 1, 2022	July 1, 2021
Total current service cost	\$ 406,316	\$ 368,647
As a % of capped pensionable earnings	20.17%	19.62%
Member and matching employer contributions	\$ 407,525	\$ 381,476
As a % of capped pensionable earnings	20.23%	20.30%
Excess of contributions over total current service cost	\$ 1,209	\$ 12,829
As a % of capped pensionable earnings	0.06%	0.68%
Capped pensionable earnings ¹	\$ 2,014,458	\$ 1,878,949
Number of members accruing benefits ²	20,073	19,020

¹ Pensionable earnings capped for contribution purposes at \$191,400 in 2022 and \$181,700 in 2021

² Excludes members on leave of absence not accruing benefits

Change in Financial Position (000's)

The major components of the change in the Funding Excess/(Shortfall) for the period from July 1, 2021 to January 1, 2022 are summarized in the following table.

Funding Excess as at July 1, 2021	\$	1,079,068
Interest on funding excess		29,802
Funding excess transferred as of January 1, 2022 from TUFA Pension Plan		9,682
Expected Funding Excess as at January 1, 2022	\$	1,118,552
Change in financial position due to experience gains/(losses)		
Gain/(loss) from investment earnings	\$	268,775 ¹
Gain/(loss) due to change in minimum guaranteed pension		7,346 ²
Gain/(loss) due to salary increases		9,830
Gain/(loss) on YMPE increase		7,607
Gain/(loss) on <i>ITA</i> maximum pension increase		(38,871)
Gain/(loss) due to indexation experience		(84,691) ³
Gain/(loss) due to retirement experience		(16,065)
Gain/(loss) due to mortality experience		391
Gain/(loss) due to termination experience		(13,339)
Gain/(loss) due to data corrections		403
Gain/(loss) on contributions/new entrants/service transfers-in		6,326
Net gain/(loss) due to other experience and miscellaneous items		7,882
Funding Excess After Experience Gains/(Losses) as at January 1, 2022	\$	1,274,146
Decrease due to change in assumptions		(151,480)
Funding Excess as at January 1, 2022	\$	1,122,666

¹ Net of additional investment return credited to Money Purchase accounts in respect of pre-conversion date benefits for Queen's University members

² In respect of pre-conversion date benefits for Queen's University members

³ Reflects July 1, 2022 indexation of 3.60% (versus assumed indexation of 1.50%) in respect of pre-conversion date benefits for University of Toronto members, October 1, 2022 indexation at 2.78% (versus assumed indexation of 0.60%) for pre-conversion date benefits for University of Guelph members, and the increase in the deferred indexation reserve in respect of pre-conversion date benefits for Queen's University members. Excess investment return indexation as of September 1, 2022 for pre-conversion date benefits for Queen's University members not known as of the preparation of this report

Going Concern Valuation Sensitivity Results

In accordance with the CIA Standards of Practice specific to pension plans, the table below presents the sensitivity of the going concern liabilities and the total current service cost to using a discount rate 1% lower and 1% higher than that used for the going concern valuation.

(000's)	Effect			
			\$	%
Going concern liabilities	\$	10,949,325		
Going concern liabilities (discount rate – 1%)	\$	12,525,011	\$	1,575,686 14.4%
Going concern liabilities (discount rate + 1%)	\$	9,753,415	\$	(1,195,910) (10.9)%
Total current service cost	\$	406,316		
Total current service cost (discount rate – 1%)	\$	521,543	\$	115,227 28.4%
Total current service cost (discount rate + 1%)	\$	326,342	\$	(79,974) (19.7)%

Plausible Adverse Scenarios

In accordance with the Canadian Institute of Actuaries Standards of Practice specific to pension plans, below is summarized scenarios of adverse but plausible assumptions, relative to the best estimate assumptions otherwise selected for the valuation.

Interest Rate Sensitivity

The table below presents the sensitivity of the going concern position of using interest rates 1% lower than the current level. In order to calculate the impact on the market value of assets, the decrease in interest rates only impacts fixed income assets (36% of total assets) and a duration of 9.1 years was considered.

(000's)	Base Scenario	Adverse Scenario	Impact (\$)
Market value of assets	\$ 12,071,991	\$ 12,464,174	\$ 392,183
Going concern liabilities	<u>10,949,325</u>	<u>12,525,011</u>	<u>1,575,686</u>
Funding Excess/(Shortfall)	\$ 1,122,666	\$ (60,837)	\$ (1,183,503)
Total Current Service Cost			
Total current service cost	\$ 406,316	\$ 521,543	\$ 115,227

Deterioration in Asset Value

In assessing the risk related to the deterioration in asset value we have chosen an adverse scenario equal to a 15% reduction in the non-fixed income asset values and assume no change in future return expectations.

The table below presents the sensitivity of the going concern position of using the assets with a 15% reduction in non-fixed income asset values.

(000's)	Base Scenario	Adverse Scenario	Impact (\$)
Market value of assets	\$ 12,071,991	\$ 10,907,647	\$ (1,614,344)
Going concern liabilities	<u>10,949,325</u>	<u>10,949,325</u>	<u>-</u>
Funding Excess/(Shortfall)	\$ 1,122,666	\$ (41,978)	\$ (1,614,344)
Total Current Service Cost			
Total current service cost	\$ 406,316	\$ 406,316	\$ -

Mortality Sensitivity

The table below presents the sensitivity of the going concern position of the Plan to using a mortality assumption with a 10% improvement to the base mortality rates. For the purposes of this analysis, we have used 90% of the rates of the base table used in the going concern valuation.

(000's)	Base Scenario	Adverse Scenario	Impact (\$)
Market value of assets	\$ 12,071,991	\$ 12,071,991	\$
Going concern liabilities	<u>10,949,325</u>	<u>11,183,331</u>	<u>234,006</u>
Funding Excess/(Shortfall)	\$ 1,122,666	\$ 888,660	\$ (234,006)
Total Current Service Cost			
Total current service cost	\$ 406,316	\$ 412,158	\$ 5,842

Section 3: Solvency Valuation Results

Solvency Valuation

The solvency valuation is a financial assessment of the UPP that is required by the *Act* and is performed in accordance with requirements prescribed by that legislation. It is intended to provide an assessment of the UPP's financial position at the valuation date on the premise that certain obligations as prescribed by the *Act* are settled on the valuation date for all members. The liabilities must be calculated based on a postulated scenario that maximizes liabilities on wind up. Contingent benefits are included in the liabilities that would be payable under the postulated scenario, unless permitted to be omitted under the definition of solvency liabilities under the Regulations to the *Act*. The solvency valuation reflects that the Joint Sponsors have not made an election to exclude the UPP from the operation of Section 74 of the *Act*. All assumptions for the solvency valuation are listed in Appendix D.

On the basis of the UPP provisions, membership data, solvency assumptions and methods and asset information described in the Appendices, as well as the requirements of the *Act*, the solvency financial position of the Plan as at January 1, 2022 is shown in the following table. The solvency financial position as of July 1, 2021 is shown for comparison purposes.

Solvency Financial Position (000's)

	January 1, 2022	July 1, 2021
Assets		
Solvency assets	\$ 12,071,991	\$ 11,230,192
Estimated wind up expenses	<u>(10,000)</u>	<u>(10,000)</u>
Total Assets	\$ 12,061,991	\$ 11,220,192
Solvency Liabilities		
Active, leave and disabled members		
Defined benefit liabilities	\$ 5,383,581	\$ 5,141,177
Money purchase liabilities	896,180	919,300
Deferred vested members		
Defined benefit liabilities	422,968	375,788
Money purchase liabilities	188,367	184,780
Pensioners and beneficiaries	5,845,898	5,547,321
Other members	<u>7,662</u>	<u>506</u>
Total Liabilities	\$ 12,744,656	\$ 12,168,872
Solvency Surplus/(Deficiency)	\$ (682,665)	\$ (948,680)
Solvency Ratio¹	0.95	0.92

As permitted under subsection 1.3.1(3) of the Regulations to the *Act*, the solvency deficiency may be specified to be a stated amount, not to be less than zero. Consequently, the solvency deficiency as at January 1, 2022 and July 1, 2021 has been specified to be zero.

¹ Solvency Assets divided by Solvency Liabilities

Solvency Valuation Sensitivity Results

In accordance with the CIA Standards of Practice specific to pension plans, the table below presents the sensitivity of the solvency liabilities to using a discount rate of 1% lower than that used for the solvency valuation.

(000's)	Effect			
			\$	%
Solvency liabilities	\$	12,744,656		
Solvency liabilities (discount rate – 1%)	\$	14,615,449	\$ 1,870,793	14.7%

Incremental Cost on a Solvency Basis

The incremental cost on a solvency basis represents the present value at January 1, 2022 of the expected aggregate change in the solvency liabilities between July 1, 2021 and the next calculation date, that is January 1, 2025. Appendix D gives more details on the calculation methodology and on assumptions.

Based on this methodology and on these assumptions, the incremental cost on a solvency basis can be found in the following table.

(000's)	January 1, 2022 to December 31, 2024
Incremental cost on a solvency basis	\$ 2,419,031

Pension Benefits Guarantee Fund (“PBGF”)

Under the Regulations to the *Act*, the UPP is not covered by the PBGF and is exempt from the annual assessment to the PBGF.

Section 4: Hypothetical Wind Up Valuation Results

Hypothetical Wind Up Valuation

A hypothetical wind up valuation is performed to determine the financial position of the UPP as at the valuation date on a wind up basis, reflecting market settlement rates as of the valuation date. Unlike the solvency valuation, all benefits are included that would be payable under the postulated scenario that would maximize benefits. The hypothetical wind up valuation is determined using benefit entitlements on the assumption that the UPP has neither a surplus nor a deficit. Contingent benefits are included in the liabilities that would be payable under the postulated scenario. Assets are set equal to market value net of estimated wind up expenses. The hypothetical wind up valuation reflects that the Joint Sponsors have not made an election to exclude the UPP from the operation of Section 74 of the *Act*. All assumptions for the hypothetical wind up valuation are listed in Appendix D.

On the basis of UPP provisions, membership data, hypothetical wind up assumptions and methods, and asset information described in the Appendices, as well as the requirements of the *Act*, the hypothetical wind up financial position of the Plan as at January 1, 2022 is shown in the following table. The hypothetical wind up financial position as of July 1, 2021 is shown for comparison purposes

Hypothetical Wind Up Financial Position (000's)

	January 1, 2022	July 1, 2021
Assets		
Hypothetical wind up assets	\$ 12,071,991	\$ 11,230,192
Estimated wind up expenses	<u>(10,000)</u>	<u>(10,000)</u>
Total Assets	\$ 12,061,991	\$ 11,220,192
Hypothetical Wind Up Liabilities		
Active, leave and disabled members		
Defined benefit liabilities	\$ 7,275,303	\$ 6,847,460
Money purchase liabilities	896,180	919,300
Deferred vested members		
Defined benefit liabilities	747,400	650,683
Money purchase liabilities	188,367	184,780
Pensioners and beneficiaries	7,051,318	6,681,789
Other members	<u>7,662</u>	<u>506</u>
Total Liabilities	\$ 16,166,230	\$ 15,284,518
Hypothetical Wind Up Surplus/(Deficiency)	\$ (4,104,239)	\$ (4,064,326)
Transfer Ratio¹	0.75	0.73

¹ Hypothetical wind up assets divided by hypothetical wind up liabilities

Section 5: Contribution Requirements

Contribution Requirements in Respect of Current Service Cost

The annual going concern cost of benefits in respect of service accruing after the valuation date is known as the current service cost.

To meet the current service cost requirements, under Sections 5.01 through 5.04 of the UPP plan text, members and participating employers each contribute 9.20% of Pensionable Earnings up to the Year's Maximum Pensionable Earnings (YMPE) plus 11.50% of Pensionable Earnings above the YMPE up to the Maximum Pensionable Earnings for Contributions (capped pensionable earnings of \$191,400 in 2022).

The following table shows as estimate of the total current and the member and matching employer contributions for the three years following the valuation date.

(000's)	For Year Following:		
	January 1, 2022	January 1, 2023	January 1, 2024
Total current service cost	\$ 406,316	\$ 422,569	\$ 439,472
As a % of capped pensionable earnings	20.17%	20.17%	20.17%
Member and matching employer contributions	\$ 407,525	\$ 423,826	\$ 440,779
As a % of capped pensionable earnings	20.23%	20.23%	20.23%
Capped pensionable earnings	\$ 2,014,458	\$ 2,095,036	\$ 2,178,837

The member and matching employer contributions satisfy the current service contribution requirements under the *Act*.

Development of Special Payments

There are no Special Payments required under the *Act*.

Excess Surplus

Excess surplus is defined in Section 147.2(2)(d) of the *Income Tax Act*, as the portion of surplus (if any) that exceeds 25% of the going concern liabilities. Since there is a going concern funding excess of 11% of the going concern liabilities, there is no excess surplus and therefore it does not impact the development of the contribution requirements for the UPP.

Maximum Eligible Contributions

Paragraph 8503(4)(a) of the Regulations to the *Income Tax Act* set a limit on member contributions that can be made to a defined benefit provision of a registered pension: the lesser of (i) 9% of the member's compensation, and (ii) the sum of \$1,000 plus 70% of the member's pension credit for the year. A waiver of this limit has been granted by the CRA to the UPP pursuant to subsection 8503(5) of the Regulations for the period from July 1, 2021 to December 31, 2023.

Under the *Income Tax Act*, the total contributions must not be more than the total current service cost plus the greater of any going concern funding shortfall and any hypothetical wind up deficiency. Given the UPP has a hypothetical wind up deficiency of \$4,104,239,000, the total contributions to the UPP representing member and matching employer contributions are eligible contributions under the *Income Tax Act*.

Section 6: Actuarial Certificate

Actuarial Opinion, Advice and Certification for the University Pension Plan Ontario

Regulatory Registration Number: 1357243

Opinion

This actuarial certification forms an integral part of the actuarial valuation report for the UPP as at January 1, 2022. We confirm that we have prepared an actuarial valuation of the UPP as at January 1, 2022, for the purposes outlined in the Introduction section to this report and consequently:

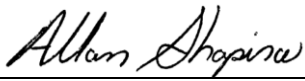
Our advice on funding is the following:

- Member and participating employer contributions stipulated in Sections 5.01 through 5.04 of the UPP plan text, which are estimated to be 20.23% of Pensionable Earnings up to the Maximum Pensionable Earnings for Contributions, should be made starting January 1, 2022 to fund the benefits accruing under the UPP.
- The next actuarial valuation for the purpose of developing funding requirements should be performed no later than as at January 1, 2025.

We hereby certify that, in our opinion:

- The member and participating employer contributions stipulated in Sections 5.01 through 5.04 of the UPP plan text are sufficient to satisfy the funding requirements of the *Act* in respect of benefits set out in the UPP.
- The member and participating employer contributions stipulated in Sections 5.01 through 5.04 of the UPP plan text are eligible contributions under Section 147.2(2) of the *Income Tax Act*, subject to the requisite approvals from the Minister of National Revenue.
- The market value of assets exceed the accrued liabilities by \$1,122,666,000 on a going concern basis.
- There is no excess surplus as defined under paragraph 147.2(2)(d) of the *Income Tax Act*.
- Pursuant to subsection 1.3.1(3) of the Regulations to the *Act*, the solvency deficiency as of January 1, 2022 has been specified to be zero.
- The transfer ratio as of January 1, 2022, as defined under the *Act*, is 0.75.
- For the purposes of the valuation:
 - The data on which this valuation is based are sufficient and reliable;
 - The assumptions used are appropriate; and
 - The actuarial cost methods and asset valuation methods used are appropriate.

- This report and its associated work have been prepared, and our opinion is given, in accordance with accepted actuarial practice in Canada and in compliance with the requirements outlined in subparagraphs 147.2(2)(a)(iii) and (iv) of the *Income Tax Act*.
- Notwithstanding the above certifications, emerging experience differing from the assumptions will result in gains or losses that will be revealed in subsequent valuations.



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September 2022



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Appendix A: Assets

Asset Data

The asset information presented in this report is based on the financial statements of the pension fund prepared by the UPP and audited by PricewaterhouseCoopers LLP. Additional asset information was provided by the UPP in the preparation of this report including the notional allocation of assets between pre-conversion date and post-conversion date benefits.

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

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

The assets as of January 1, 2022 include the transfer of assets as of that date to the UPP from the TUFA Pension Plan.

Target Asset Mix

The asset mix ranges for the UPP are contained in the Statement of Investment Policies and Procedures (SIP&P) effective January 1, 2022, and are shown below. The SIP&P notes that a target asset mix is still being determined but the current levels may be used as interim proxy. The target asset mix below is based on the asset mix as of January 1, 2022.

Asset Class	Minimum	Target (Current)	Maximum
Public equity	35%	46% ¹	65%
Private equity	3%	6%	10%
Private debt	4%	7%	10%
Absolute return	2%	7% ²	12%
Fixed income	20%	34% ³	50%
Inflation sensitive bonds	0%	0%	10%
Real estate	2%	3%	8%
Infrastructure	1%	2%	8%
Cash/funding	-20%	<u>-5%</u>	10%
		100%	

¹ Decreased from 52% as of July 1, 2021

² Increased from 5% as of July 1, 2021

³ Increased from 30% as of July 1, 2021

Reconciliation of Changes in Market Value of Assets

The table below reconciles changes in the market value of assets between July 1, 2021 and December 31, 2021.

(000's)

Market Value of Assets, July 1, 2021	\$ 11,230,192
Contributions	
Member contributions	\$ 94,032
Employer contributions	98,326
Transfers into plan/past service buybacks	<u>8,317</u>
Total	\$ 200,675
Benefit Payments	
Pensioner payments	\$ 211,071
Lump-sum payments	<u>42,761</u>
Total	\$ 253,832
Fees/Expenses	
Investment fees/expenses ¹	\$ -
Non-investment fees/expenses ²	<u>12,217</u>
Total	\$ 12,217
Investment Income	\$ 629,937
Market Value of Assets, December 31, 2021	\$ 11,794,755
Assets Transferred as of January 1, 2022 From TUFA Pension Plan	\$ 277,236
Market Value of Assets, January 1, 2022	\$ 12,071,991
Rate of Return, Net of All Fees and Expenses (Dollar-Weighted)	5.5%

Development of Actuarial Value of Assets

The actuarial value of assets is equal to the market value of assets, adjusted for contributions, benefit payments, transfers and fees/expenses in-transit, as of the valuation date.

¹ Netted from investment income

² Net of special contributions made to defray these expenses

Appendix B: Membership Data

Source of Data

This valuation was based on member data as of January 1, 2022 compiled by the UPP from the various pension administration providers and consolidated by Aon. Tests of the sufficiency and reliability of the member data were performed and the results were satisfactory. The tests included:

- A reconciliation of membership status against the membership status at the last valuation. This test is performed to ensure that all members were accounted for;
- A reconciliation of birth, hire, and participation dates against the corresponding dates provided for the last valuation to ensure consistency of data;
- A reconciliation of pensionable service against the corresponding amount provided for the last valuation to ensure the service accrued is as expected;
- A reconciliation of pensionable earnings against the corresponding amounts provided for the last valuation to identify any unusual increases or decreases;
- A reconciliation of accrued benefits against the corresponding amounts provided for the last valuation to identify any unusual benefit accruals;
- A reconciliation of any stated benefit payments since the last valuation (for retired, terminated, or deceased members) against the financial statements of the pension fund for confirmation of the payments; and
- A reconciliation of inactive member benefit amounts against the corresponding amounts provided for the last valuation to ensure consistency of data.

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

Membership Reconciliation

The table below reconciles the number of members as of January 1, 2022 with the number of members as of July 1, 2021 and the changes due to experience in the period.

	Active, Leave and Disabled Members	Pensioners and Beneficiaries	Deferred Vested Members	Other Members ¹	Total
Members, July 1, 2021	19,818	11,935	5,331	44	37,128
Changes due to:					
New entrants	1,276	-	-	-	1,276
New entrants - Trent	301	208	38	-	547
Returned from deferred	11	-	(11)	-	-
Retirement	(219)	258	(39)	-	-
Termination					
Pending	(85)	-	(15)	100	-
Deferred vested	(456)	-	456	-	-
Lump sum	(95)	-	(133)	-	(228)
Death					
No further benefits	-	(122)	-	-	(122)
Surviving beneficiary	-	(58)	-	-	(58)
Lump sum	(3)	(2)	(2)	-	(7)
New beneficiary					
Surviving beneficiary	-	58	-	-	58
Marriage breakdown spouse	-	-	-	-	-
Data correction	-	(1)	(26)	-	(27)
Net change	730	341	268	100	1,439
Members, January 1, 2022	20,548	12,276	5,599	144	38,567

¹ Terminated members with lump sum payments pending as of January 1, 2022.

Membership Summary

Active, Leave and Disabled Members

	January 1, 2022	July 1, 2021
Number	20,548 ¹	19,818 ²
Average Age	46.5	46.6
Average Age at Hire	35.1	35.0
Average Years of Pensionable Service	9.9	10.1
Average Pensionable Earnings (100% FTE)	\$ 105,026	\$ 103,398
Average Capped Pensionable Earnings (100% FTE)	\$ 101,593	\$ 99,200
Average Capped Pensionable Earnings (Actual % FTE)	\$ 99,792 ³	\$ 95,851 ⁴

Pensioners and Beneficiaries

	January 1, 2022	July 1, 2021
Number	12,276	11,935
Average Age	76.0	75.9
Average Annual Benefit	\$ 36,487	\$ 35,511 ⁵
Total Annual Pensions	\$ 447,914,412	\$ 423,825,336

Deferred Vested Members

	January 1, 2022	July 1, 2021
Number	5,599	5,331
Average Age	52.4	52.5
Average Annual Benefit	\$ 5,432	\$ 5,071
Average Money Purchase Balances ⁶	\$ 136,202	\$ 123,486

¹ January 1, 2022 data includes 475 leaves of absence who are not accruing pension benefits as of the valuation date

² July 1, 2021 data includes 798 leaves of absence who are not accruing pension benefits as of the valuation date

³ Average capped pensionable earnings (actual % FTE) for 20,073 members accruing benefits are \$100,357

⁴ Average capped pensionable earnings (actual % FTE) for 19,020 members accruing benefits are \$98,788

⁵ Actual pension paid for Queen's University pensioners and beneficiaries; true pension with estimated indexation at September 1, 2021 used to value liabilities

⁶ For pre-conversion date benefits for Queen's University members

Active/Disabled Membership Distribution

The following table provides a detailed summary of the active/disabled membership at the valuation date by years of credited service and by age group. For privacy reasons, average pensionable earnings is not shown for groups with two or less members.

Age	< 5	5–10	10–15	s	20–25	25–30	>30	Total
< 30	1,364 \$ 63,773	63 \$ 71,604						1,427 \$ 64,119
30–35	1,709 \$ 81,026	465 \$ 80,585	31 \$ 82,542					2,205 \$ 80,955
35–40	1,736 \$ 88,231	825 \$ 95,431	297 \$ 91,751	31 \$ 88,764				2,889 \$ 90,654
40–45	1,234 \$ 91,048	930 \$ 103,839	590 \$ 109,483	259 \$ 97,614	17 \$ 85,198			3,030 \$ 99,092
45–50	763 \$ 87,268	596 \$ 102,725	705 \$ 119,781	492 \$ 123,360	178 \$ 103,051	3 \$ 110,906	1 *	2,738 \$ 106,575
50–55	587 \$ 85,729	436 \$ 101,010	476 \$ 113,133	716 \$ 130,715	415 \$ 127,440	62 \$ 99,065	16 \$ 85,079	2,708 \$ 111,594
55–60	421 \$ 84,171	338 \$ 89,874	397 \$ 106,266	533 \$ 122,809	642 \$ 125,958	273 \$ 115,746	126 \$ 96,990	2,730 \$ 109,210
60–65	250 \$ 73,915	244 \$ 90,020	268 \$ 95,342	358 \$ 113,471	324 \$ 134,327	305 \$ 130,286	304 \$ 117,900	2,053 \$ 109,946
>65	88 \$ 71,885	80 \$ 101,024	87 \$ 110,686	91 \$ 126,877	106 \$ 143,405	85 \$ 160,690	231 \$ 156,123	768 \$ 130,869
Total Count	8,152	3,977	2,851	2,480	1,682	728	678	20,548
Average Capped Pensionable Earnings	\$ 81,959	\$ 96,297	\$ 108,758	\$ 120,945	\$ 126,199	\$ 125,645	\$ 126,351	\$ 99,792

Pensioners and Beneficiaries Membership Distribution

The following table provides a detailed summary of the pensioners and beneficiaries at the valuation date by age group.

Age	Pensioners and Beneficiaries ¹	
< 50	Count	33
	Average annual pension	\$ 18,683
50–54	Count	28
	Average annual pension	\$ 15,723
55–59	Count	167
	Average annual pension	\$ 21,137
60–64	Count	874
	Average annual pension	\$ 31,014
65–69	Count	2,263
	Average annual pension	\$ 33,422
70–74	Count	2,685
	Average annual pension	\$ 36,698
75–79	Count	2,338
	Average annual pension	\$ 42,078
80–84	Count	1,739
	Average annual pension	\$ 41,326
85–89	Count	1,216
	Average annual pension	\$ 35,830
90–94	Count	661
	Average annual pension	\$ 31,960
95+	Count	272
	Average annual pension	\$ 26,165
Total		
Count		12,276
Average Annual Pension		\$ 36,487

¹ Reflects actual pension paid for Queen's University pensioners and beneficiaries; true pension with estimated indexation at September 1, 2021 used to value liabilities

Appendix C: Going Concern Assumptions and Methods

Assumptions and Methods

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

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

This appendix summarizes the going concern assumptions and methods that have been used for the going concern valuation of the UPP at the valuation date. The going concern assumptions and methods have been chosen to reflect our understanding of the Plan's funding objectives as outlined in the Funding Policy with due respect to accepted actuarial practice and regulatory constraints.

The actuarial assumptions and methods are summarized below and described on the following pages.

	January 1, 2022	July 1, 2021
Economic Assumptions		
Discount rate	5.45% per year	5.60% per year
Increase in consumer price index (CPI)	2.00% per year	Same
Cost-of-living adjustment (75% of CPI)	1.50% per year ¹	Same
Cost-of-living adjustment (CPI –2%)	0.60% per year ²	Same
Increases in pensionable earnings		
Active and leave members	4.00% per year	Same
Disabled members ³	2.00% per year	Same
Increases in YMPE	\$64,900 in 2021; then 2.75% per year	\$61,600 in 2020; then 2.75% per year
Increases in <i>ITA</i> maximum pension	\$3,420.00 in 2022; then 2.75% per year	\$3,245.56 in 2021; then 2.75% per year
Interest on member contributions	2.50% per year ⁴	Same
Passive investment expenses	0.05% per year ⁵	Same
Non-investment expenses	0.20% per year ⁵	Same

¹ 3.60% as of July 1, 2022 for pre-conversion date benefits for University of Toronto members

² 0.6% per year (determined stochastically) for pre-conversion date benefits for University of Guelph members; 2.78% for October 1, 2022 indexation

³ Members receiving (or deemed eligible to receive) disability income from an LTD plan

⁴ Interest of 5.45% per year (5.60% for July 1, 2021 valuation) on money purchase account balances in respect of pre-conversion date benefits for Queen's University members

⁵ Taken into account in discount rate assumption

	January 1, 2022	July 1, 2021
Demographic Assumptions		
Mortality table	95% of 2014 Canadian Public Sector Pensioners' Mortality Table, with mortality improvements scale MI-2017 from 2014 (sex-distinct rates)	Same
Retirement rates	Variable by age (Table A following)	Same
Termination rates	Variable by age (Table B following)	Same
Disability rates	None	Same
Proportion with spouse		
Non-retired proportion with spouse	85% for male members and 75% for female members	Same
Non-retired spousal age differential	Male members with spouse four years younger and female members with spouse two years older	Same
Retired members	Actual marital status and ages are used	Same
Termination-option election		
Lump-sum transfer	40%	50%
Lump-sum transfer value rate	1.97% per year ¹	Same
Other Assumptions²		
Non-reduction reserve	7.5% applied to money purchase accounts; cost of non-reduction for active members reflects that a non-reduction charge of 4.5% is actually applied	Same
	7.5% applied to liabilities for pensioners and beneficiaries, which have been determined using true pension rather than actual pension	7.5% applied to liabilities for pensioners and beneficiaries, which have been determined using true pension (estimated with indexation at September 1, 2021) rather than actual pension
Deferred indexing reserve	Reflects expected indexation to true pensions based on fund returns to date and expected future returns	Same

¹ Commuted value based on an increase in CPI of 2.00% per year, cost-of-living adjustment of 75% of CPI, and a nominal discount rate of 3.50% per year

² For pre-conversion date benefits for Queen's University members; non-reduction reserve based on stochastic modelling

	January 1, 2022	July 1, 2021
Methods		
Actuarial cost method	Projected unit credit	Same
Asset valuation method	Market value of assets adjusted to reflect contributions, benefit payments, transfers and fees/expenses in transit as of the valuation date	Same

Table A—Retirement Rates

Faculty

- 2% from ages 55 through 59 inclusive
- 5% from ages 60 through 64 inclusive
- 30% from ages 65 through 68 inclusive
- 50% from ages 69 through 70 inclusive
- 100% at age 71
- Additional 5% at age 60 with 80 age-plus-service points

Staff

- 2% from age 55 through 59 inclusive
- 7% from ages 60 through 64 inclusive
- 50% from ages 65 through 67 inclusive
- 100% at age 68
- Additional 15% at age 60 with 80 age-plus-service points.

Table B—Termination Rates

Rates used in this valuation are shown as rates per 1,000 lives in the following table:

Present Age	Rates	Present Age	Rates
20	150	40	33
21	150	41	31
22	150	42	30
23	150	43	28
24	150	44	26
25	150	45	24
26	135	46	22
27	120	47	20
28	107	48	18
29	95	49	16
30	84	50	14
31	75	51	12
32	68	52	10
33	60	53	8
34	54	54	6
35	48		
36	45		
37	42		
38	39		
39	36		

Justification of Actuarial Assumptions and Methods

Economic Assumptions

Discount Rate

For purposes of the conversion date valuation as of July 1, 2021, the use of a 5.60% discount rate with an assumed inflation rate of 2.00% per year was specified in the Funding Policy adopted by the Joint Sponsors. With the subsequent revision to the target asset mix under the SIP&P, as outlined on page 22 of this report, the 5.60% discount rate has been lowered to 5.45% for purposes of the January 1, 2022 valuation.

The overall expected return was developed using best-estimate returns for each of the asset classes above. A Monte Carlo simulation is performed over 30 years where the portfolio returns are projected assuming annual rebalancing. The average of the 30-year geometric return is used to develop an overall best-estimate rate of return for the entire pension fund. Gains from rebalancing and diversification are implicit to this return.

The following table lays out the adjustments that have been made to the overall expected rate of return in order to arrive at the going concern discount rate assumption:

Development of Discount Rate

Overall expected return	5.71%
Passive investment expenses	(0.05)%
Non-investment expenses	(0.20)%
Additional returns due to active management (net of fees)	0.00%
Rounding	<u>0.01%</u>
Discount Rate	5.45%

There continues to be no margin for adverse deviations in the 5.45% discount rate. On an ongoing basis, the Board will set the discount rate for the Plan, including the appropriate margin for adverse deviations taking into account the risk profile of the UPP.

Increase in Consumer Price Index

The CPI rate assumption reflects our best estimate of future long-term inflation and represents the mid-point of the Bank of Canada target inflation.

Increases in Pensionable Earnings

The assumption for increases in pensionable earnings for active members reflects the assumed rate of inflation, plus allowances for the effect of merit and promotion increases and grid step movement.

The assumption for increases in pensionable earnings for disabled members reflects the assumed rate of inflation.

Increases in YMPE

As the benefits paid to a member from the UPP are dependent on the future YMPE, it is necessary to make an assumption regarding the future increases in the YMPE.

The assumed increase in the YMPE reflects the assumed rate of inflation plus the productivity increase assumption of 0.75% per year.

Increases in the Maximum Pension Limit

Pensions are limited to the maximum limits under the *Income Tax Act*. The *Income Tax Act* specifies both a dollar limit, and in addition pensions cannot exceed 2.00% of indexed highest average compensation per year of pensionable service. The assumed increase in the dollar limit reflects the assumed rate of inflation plus the productivity increase assumption of 0.75% per year.

Interest on Member Contributions

Interest is credited on member contributions with the rate credited by chartered banks on five-year personal fixed term deposits. The assumption for interest on member contributions reflects our long-term expectation of these rates.

Expenses

Since the discount rate has been established net of investment and administration expense, no explicit assumption is required.

Demographic Assumptions

Mortality

During 2014, the CIA completed a study of Canadian pensioner mortality levels and trends. The 2014 study published mortality rates split by sector and included Public, Private and Combined tables, as well as possible pension size adjustment factors. In 2017, a new mortality improvement scale (MI-2017) was developed and published by CIA to account for broader mortality improvements for the Canadian population. The continued use of this mortality table and projection scale are considered reasonable.

To address the specifics of the UPP demographics and recent experience under the single-employer pension plans (SEPPs) from which the members transferred on July 1, 2021, we have used 95% of the 2014 Canadian Public Sector Pensioners' Mortality Table with mortality improvement scale MI-2017 from 2014.

Retirement

Different retirement rates are used for Faculty and Staff to reflect the different underlying experience. The retirement rates reflect recent experience under the SEPPs. A significant proportion of Faculty and Staff continue to work beyond age 65.

Termination of Employment

The rates of termination of employment before retirement represent a best estimate of termination rates for a plan of the size and workforce characteristics of the UPP membership, reflecting the recent experience under the SEPPs.

Option Elections on Termination

We have assumed that a portion of members will elect a deferred annuity, while others will elect a commuted value transfer or cash on termination. In recognition of the lower prevailing discount rates and to determine commuted values, we have employed a different discount rate basis used to calculate termination benefits for those that elect a lump-sum transfer value.

Disability

If an active member becomes disabled, contributory service continues to accrue until retirement date, but member contributions are waived. Since this benefit is substantially the same as the benefit that accrues to an active member, no disability assumption was used. Use of an actual disability assumption in this case would reduce liabilities slightly, so a nil disability incidence assumption represents a small element of conservatism. The disability assumption has very little impact on the valuation results.

Proportion of Members with Spouses and Spousal Age Differential

These assumptions are relevant to the valuation of benefits since there is a subsidized joint and survivor benefit available for members with a spouse. The proportion of members who will have a spouse is based on recent experience under the SEPPs. The spousal age difference was based on observance of actual age differences in the group for members where the spouse age is known.

Other

Actuarial Cost Method

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

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

With respect to service after the valuation date, the expected value of benefits for service in the year following the valuation date (i.e., the current service cost) net of any required member contributions is expressed as a percentage of the expected value of participating payroll for that year.

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

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

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

Asset Valuation Method

Market value, adjusted by in-transit cash flows was used as the actuarial value of assets for this valuation.

Appendix D: Solvency and Hypothetical Wind Up Assumptions and Methods

Valuation Assumptions

	January 1, 2022	July 1, 2021
Economic Assumptions		
Discount rate (without indexation)		
Transfer value basis	2.10% per year for 10 years; 3.10% per year thereafter	1.80% per year for 10 years; 3.30% per year thereafter
Annuity purchase basis	2.86% per year	2.95% per year
Discount rate (with indexation at 75% of CPI)		
Transfer value basis	1.00% per year for 10 years; 1.50% per year thereafter	1.00% per year for 10 years; 1.70% per year thereafter
Annuity purchase basis	0.30% per year	0.45% per year
Discount rate (with indexation at CPI-2%)		
Transfer value basis	2.00% per year for 10 years; 2.60% per year thereafter	1.80% per year for 10 years; 2.80% per year thereafter
Annuity purchase basis	1.20% per year	1.30% per year
Income Tax Act dollar limit	\$3,420 per year	\$3,245.56 ¹ per year
Duration used to set annuity purchase basis ²	11.22	10.90

¹ For pre-conversion date benefits for Queen's University members, increasing to \$3,420.00 in 2022, at 2.39% per year thereafter for 9 years and 3.09% per year thereafter

² Based on liabilities assumed to be settled through the purchase of annuities

	January 1, 2022	July 1, 2021
Demographic Assumptions		
Mortality table	2014 Canadian Pensioners' Mortality Table (Combined), with mortality improvement scale CPM-B (sex-distinct rates); 90% of rates applied for annuity purchases	Same
Termination rates	Not applicable	Same
Retirement age		
Active, leave and disabled members		
Settled through annuity purchase	Age that produces highest actuarial value (including statutory grow-in rights if applicable)	Same
Settled through transfer value	50% of the age that produces the highest actuarial value and 50% at the earliest unreduced commencement age (including statutory grow-in rights if applicable)	Same
Deferred vested members	Earlier of unreduced early retirement date and normal retirement date	Same
Retired members and beneficiaries	Not applicable	Same
Termination of employment	Terminate with full vesting	Same
Spousal status		
Non-retired spousal proportion	85% for male members and 75% for female members	Same
Non-retired spousal age differential	Male members with spouse four years younger and female members with spouse two years older	Same
Retired members	Actual marital status and ages are used	Same
Other		
Wind up expenses	\$10,000,000	Same
Actuarial cost method	Unit credit	Same
Asset valuation method	Market value of assets adjusted to reflect contributions, benefit payments, transfers and fees/expenses in transit as of the valuation date	Same
Incremental Cost		
The assumptions for the expected benefit payments and decrement probabilities, service accruals, and projected changes in benefits and/or pensionable earnings	Same as going concern	Same

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

	Percent of Liability Assumed to be Settled By Purchase of Annuities	Percent of Liability Assumed to be Settled By Lump-Sum Transfer
Active Members		
Not retirement eligible	0%	100%
Retirement eligible	75%	25%
Active Members—Queen's Pre-Conversion Benefits		
Not retirement eligible	30%	70%
Retirement eligible	50%	50%
Deferred Vested Members		
Not retirement eligible	100%	0%
Retirement eligible	100%	0%
Retired Members and Beneficiaries	100%	0%

Postulated Scenario

The postulated scenario is the assumption of immediate termination of employment for the active group at the valuation date. Therefore, no allowance for future salary increases or demographic experience are reflected.

Benefits Valued

	Solvency Valuation	Hypothetical Wind Up Valuation
Vesting	We have treated all accrued benefits as vested on Plan wind up.	We have treated all accrued benefits as vested on Plan wind up.
Grow-in Benefits	Active members with 55 age-plus-continuous service points as of the valuation date are assumed to grow into the enhanced early retirement reduction.	Active members with 55 age-plus-continuous service points as of the valuation date are assumed to grow into the enhanced early retirement reduction.
Indexing	In accordance with the <i>Pension Benefits Act</i> (Ontario), solvency liability excludes the value of future escalated adjustments (future indexation) for both the preretirement and postretirement period (if applicable).	Hypothetical Wind Up Valuation liabilities include the value of future escalated adjustments (future indexation) in the preretirement and postretirement period (if applicable).

Justification for Valuation Assumptions

We have set the aforementioned assumptions based on guidance prepared by the CIA Committee on Pension Plan Financial Reporting (“PPFRC”) in Educational Note – Assumptions for Hypothetical Wind-Up and Solvency Valuations with Effective Dates between December 31, 2021 and December 30, 2022 (“CIA Guidance”) released on March 11, 2022.

For benefit entitlements that are expected to be settled by lump-sum transfer, we based the assumptions on Section 3500 (Pension Commuted Values) of the CIA Standards of Practice, using rates corresponding to a valuation date of January 1, 2022.

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

Mortality Table

The use of 90% of the 2014 Canadian Pensioners’ Mortality Table (Combined) with mortality improvement scale CPM-B reflects the expectation that annuity pricing for a university pension plan will reflect higher longevity.

Preretirement Mortality

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

Pensionable Earnings

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

Assumptions Not Needed

The following are not relevant to the solvency or hypothetical wind up valuation:

- Increases in pensionable earnings;
- Increases in YMPE;
- Increases in *ITA* maximum pension limit (unless otherwise noted); and
- Termination of employment rates.

Estimated Wind Up Expenses

Plan wind up expenses would normally include such items as fees related to preparation of the actuarial wind up report, fees imposed by a pension supervisory authority, legal fees, administration, custodial and investment management expenses. We calculated this as a flat \$10,000,000.

Unisex Assumption

The liabilities are valued on a sex-distinct basis. The determination of the unisex percentage used in the payment of commuted values to members eligible for portability is based on the proportion of active and deferred vested member liabilities for males and females. As such, the determination of commuted value liabilities on a sex-distinct basis in the solvency/hypothetical wind-up valuation is appropriate.

Actuarial Cost Methods

Unit credit (accrued benefit) cost method as prescribed.

Asset Valuation Method Considerations

Assets for solvency purposes have been determined using market value.

Incremental Cost

The incremental cost represents the present value, at the calculation date (time 0), of the expected aggregate change in the liabilities between time 0 and the next calculation date (time t), adjusted upwards for expected benefit payments between time 0 and time t.

An educational note was published in December 2010 by the CIA Committee on PPFRC to provide guidance for actuaries on the calculation of this new information.

The calculation methodology can be summarized as follows:

- The present value at time 0 of expected benefit payments between time 0 and time t, discounted to time 0,
plus
- Projected liabilities at time t, discounted to time 0, allowing for, if applicable to the pension plan being valued:
 - expected decrements and related changes in membership status between time 0 and time t,
 - accrual of service to time t,
 - expected changes in benefits to time t,
 - a projection of pensionable earnings to time t,
 minus
- The liabilities at time 0.

The projection calculations take into account the following assumptions and additional considerations:

- The assumptions for the expected benefit payments and decrement probabilities, service accruals, and projected changes in benefits and/or pensionable earnings would be consistent with the assumptions used in the pension plan's going concern valuation.
- The assumptions used to calculate the projected liability at time t are consistent with the assumptions for the liabilities at time 0, assuming that interest rates remain at the levels applicable at time 0, that the select period is reset at time t for interest rate assumptions that are select and ultimate and that the Standards of Practice for the calculation of commuted values and the guidance for estimated annuity purchase costs in effect at time 0 remain in effect at time t.
 - Active and inactive plan members as of time 0 are considered in calculating the incremental cost.

Appendix E: Summary of Plan Provisions

Provisions for UPP Service

The following is a summary of the main provisions of the UPP applicable to this valuation. These provisions apply to pension benefit entitlements earned on or after the July 1, 2021 conversion date (or such later conversion date for new participating employers). Different provisions apply to certain members of the UPP as set out in the UPP plan text. These provisions have not been incorporated into this summary on the basis that they are not material to the valuation.

Effective Date	January 1, 2020.
Conversion Date	July 1, 2021.
Eligibility	<p>Full-time employees of a participating employer must become a member of the UPP on the first day of the month coincident with or immediately following the date of employment.</p> <p>Other than continuous full-time employees of a participating employer may elect to become a member on the first day of any month if the employee has either of the following in the two consecutive calendar years immediately prior to applying for membership in the UPP:</p> <ul style="list-style-type: none"> (a) Earnings from an eligible class of employment of at least 35% of the YMPE with one or more participating employers; or (b) At least 700 hours from an eligible class of employment with one or more participating employers.
Normal Retirement Eligibility	Last day of the month coincident with or in which the member attains age 65.
Benefit	<p>For Pensionable Service on or after July 1, 2021 up to and including December 31, 2024</p> <p>Annual benefit equal to (a) + (b) below for each year of Pensionable Service:</p> <ul style="list-style-type: none"> (a) 1.6% of Best Average Earnings up to the Average YMPE. (b) 2.0% of Best Average Earnings in excess of the Average YMPE.

For Pensionable Service on or after January 1, 2025

Annual benefit equal to (a) + (b) below for each year of Pensionable Service:

- (a) 1.6% of Best Average Earnings up to the Average YAMPE.
- (b) 2.0% of Best Average Earnings in excess of the Average YAMPE.

Unreduced Early Retirement

Eligibility

Age 60 and age-plus-Eligibility Service totaling 80 or more.

Benefit

The benefit calculated under the normal retirement formula based on Best Average Earnings, Average YMPE/ Average YAMPE and Pensionable Service as of early retirement date, without reduction for early commencement.

Grandparenting: For members at University of Toronto and University of Guelph who are within 3 years of attaining eligibility for reduced early retirement as a member of one of the Prior Plans as of July 1, 2021, the unreduced early retirement date determined under the Prior Plan will continue to apply to pension benefits earned for UPP service if it provides an earlier unreduced date than above (age 60 and 10 years of Pensionable Service or 15 years of Pensionable Service for certain University of Toronto members; age 55 and 85 age-plus-Pensionable Service points for certain University of Guelph members).

Reduced Early Retirement

Eligibility

Last day of the month coincident with or in which the member attains age 55 and not eligible for unreduced early retirement.

Benefit

The benefit calculated under the normal retirement formula based on Best Average Earnings, Average YMPE/ Average YAMPE and Pensionable Service as of early retirement date, reduced by 5% for each year that early retirement date precedes normal retirement date.

Postponed Retirement

Eligibility

Any age after normal retirement date that the member terminates employment, but for plan purposes, pension benefits must commence no later than December 1 of the year in which the member's 71st birthday occurs.

Benefits

The benefit calculated under the normal retirement formula based on Best Average Earnings, Average YMPE/ Average YAMPE and Pensionable Service as of postponed retirement date.

Disability Accrual

Eligibility

If eligible (or deemed eligible) to receive disability income from Long-Term Disability Plan of the participating employer.

Benefit

The benefit calculated under the normal retirement formula, payable at normal retirement date, based on Pensionable Service which continues to accrue during periods of disability and on Pensionable Earnings in effect immediately prior to the commencement of disability increased at the same rate and at the same time as any increase granted to the disability income from the Long-Term Disability Plan.

Termination of Service

Eligibility

Any age prior to eligibility for early retirement.

Benefit

A terminating member may choose one of the following options:

- (a) A benefit calculated under the normal retirement formula based on Best Average Earnings, Average YMPE/Average YAMPE and Pensionable Service at termination date, payable at normal retirement date (or actuarially reduced for early commencement).
- (b) A transfer of the commuted value of the accrued benefit to a new employer's pension plan, another prescribed retirement savings vehicle, or a life insurance company to purchase an annuity (provided the funds are transferred on a "locked-in" basis).

Death in Service

Eligibility

Any age.

Benefit

Lump-sum death benefit equal to the commuted value of the accrued benefit calculated under the normal retirement formula based on Best Average Earnings, Average YMPE/Average YAMPE and Pensionable Service at date of death. If the beneficiary is the spouse, the spouse shall receive an immediate pension unless he or she chooses a lump-sum cash payment, a transfer to an RRSP or RRIF, or a deferred pension. A beneficiary who is not a spouse, or an estate, will receive the benefit as a single lump-sum cash payment.

Minimum Employer Cost

On retirement, death, or termination, the required member contributions with interest, cannot provide more than 50% of the commuted value of the benefit. In the event that required member contributions provide for more than 50%, the excess will be refunded to the member or beneficiary, if applicable. The calculation of excess refunds is amalgamated for service under the Prior Plans and the UPP.

Normal Form of Pension

The normal form for members with a spouse at pension commencement date is a life annuity with 50% continuing thereafter to the surviving spouse for their lifetime. If the spouse is more than 10 years younger than the member, the pension will be actuarially reduced to reflect the number of years in excess of 10 that the spouse is younger than the member. Legislated 60% continuation to the spouse unless the right is waived pursuant to the legislation will be on an actuarially equivalent basis to the 50% continuation.

For members without a spouse at pension commencement, the normal form is a life annuity with a 10-year guarantee period.

Funded Conditional Indexation

Funded conditional indexation under which annual cost-of-living adjustments equal to 75% of the increase in CPI are made to pensions in payment each January 1st (prorated to reflect the number of months from pension commencement date to January 1st). The Joint Sponsors may, in accordance with the Funding Policy, decide that any prospective cost-of-living adjustment to pensions earned for pensionable service on and after the conversion date under the UPP provisions will be paid at a rate lower than 75% of the increase in CPI. Despite the previous sentence, the Joint Sponsors have agreed to grant adjustments at the 75% rate up to and including January 1, 2028.

Contribution Rates

Each member contributes each year an amount equal to 9.20% of Pensionable Earnings up to the YMPE (YAMPE starting in 2025) plus 11.50% of Pensionable Earnings in excess of the YMPE (YAMPE starting in 2025) and up to the Maximum Pensionable Earnings for Contributions.

Participating employers match the member contributions, and under certain types of leaves and programs may make part or all of the member's contributions.

Definitions

Average YMPE	The average of the Year's Maximum Pensionable Earnings (YMPE) during the last consecutive 48 months of participation in the UPP and Prior Plan prior to retirement, termination of death.
Average YAMPE	The average of the Year's Additional Maximum Pensionable Earnings (YAMPE) during the last consecutive 48 months of participation in the UPP and the Prior Plan prior to retirement, termination or death. If the last 48 months of participation includes periods before and after January 1, 2025, the YAMPE before 2025 will be 114% of the YMPE for that period.
Best Average Earnings	The average of the highest 48 completed months (need not be consecutive) of Pensionable Earnings during participation in the UPP and the Prior Plan up to the date of retirement, termination or death. Best Average Earnings will be capped at the level at which the <i>Income Tax Act</i> maximum pension is reached at the date of determination.
Credited Interest	Minimum rate prescribed by the <i>Pension Benefits Act</i> (Ontario) and its Regulations.
Eligibility Service	Member's years and fraction of years of continuous service with a participating employer, plus any periods of employment that became recognized as pensionable service under a Prior Plan during such periods of continuous service, plus periods of employment with prior employers that becomes recognized as Pensionable Service under the UPP.
Maximum Pensionable Earnings for Contributions	\$191,400 in 2022, increased each Plan Year after 2022 by the percentage increase in the <i>Income Tax Act</i> maximum pension, subject to adjustments to this increase based on the advice of the UPP actuary.
Pensionable Earnings	Basic or regular salary/wages excluding overtime, bonuses, and special payments; may include academic administrative stipends or acting salary at certain participating employers. Note: This is a generic description. The UPP contains specific provisions that govern Pensionable Earnings at each participating employer.
Pensionable Service	Member's years and fractions of years of continuous service with a participating employer on or after the conversion date during which the member contributes to the UPP, plus periods of employment with prior employers

that becomes recognized as Pensionable Service under the UPP. For service of a member employed on a part-time basis, the period of service is multiplied by the percentage appointment.

Plan Year

The period of 12 consecutive months commencing on January 1.

Prior Plans

The single employer pension plan in which members participated in at Queen's University, University of Guelph and University of Toronto, as applicable, and from which liabilities have been transferred to the UPP.

A copy of a letter from the Board of Trustees certifying the accuracy and completeness of the UPP provisions summarized in this report, including the benefit provisions for pre-conversion date service that follow in this section, is included in Appendix F of this report.

University of Toronto—Provisions for Pre-Conversion Date Service

The following is a summary of the main provisions that apply to pre-conversion date service for members accruing benefits under the University of Toronto Pension Plan as of June 30, 2021 and for whom pension benefit entitlements have been transferred to the UPP effective July 1, 2021. The provisions of the University of Toronto Pension Plan in effect on June 30, 2021 apply to the pension benefit entitlements for pensioners, beneficiaries and deferred vested members transferred to the UPP effective July 1, 2021.

Conversion Date	July 1, 2021
Normal Retirement Eligibility	Last day of the month coincident with or in which the member attains age 65 (June 30 coincident with or next following the attainment of age 65 for deferred vested members as of June 30, 2021)
Benefit	<p>For Full-Time Service, and Part-Time Service on or after July 1, 1987 up to and including June 30, 2021 Annual benefit equal to (a) + (b) below for each year of Pensionable Service up to and including June 30, 2021:</p> <p><i>Academic Staff, Librarians and Research Associates</i></p> <p>(a) 1.5% of Highest Average Salary up to the Average CPP Maximum Salary.</p> <p>(b) 2.0% of Highest Average Salary in excess of the Average CPP Maximum Salary.</p> <p><i>Administrative Staff, Unionized Administrative Staff and Unionized Staff</i></p> <p>(a) 1.6% of Highest Average Salary up to the Average CPP Maximum Salary.</p> <p>(b) 2.0% of Highest Average Salary in excess of the Average CPP Maximum Salary.</p> <p>For Part-Time Service before July 1, 1987 Annual benefit equal to 2% of indexed salary for each year of participation, where indexed salary is the salary paid in the University Year in which the benefit is earned, indexed by the increases in the Average Industrial Wage from the end of the University Year to the beginning of the University Year in which the member retires, terminates, or dies in active service of the University, whichever occurs first.</p>

Maximum Pension

The annual benefit for a member cannot exceed the lesser of:

- Defined benefit limit on such date times years of pensionable service; and
- 2.0% of the average of the best three consecutive years of salary times pensionable service.

Regulation 8504(6) imposes a lower maximum benefit limit in respect of any pre-1990 service that is granted after June 8, 1990.

Unreduced Early Retirement Eligibility

Academic Staff and Librarians¹

December 31 or June 30 following attainment of age 60 and 10 or more years of Pensionable Service

Administrative Staff—P/Ms 6 and Above

Age 60 and 15 or more years of Pensionable Service

Administrative Staff (Other Than Above), Unionized Administrative Staff, Unionized Staff and Research Associates

Age 60 and age-plus-continuous service (including transferred-in pensionable service) totaling 80 or more.

Benefit

The benefit calculated under the normal retirement formula based on Highest Average Salary, Average CPP Maximum Salary, and Pensionable Service as of early retirement date, without reduction for early commencement.

Reduced Early Retirement Eligibility

Within 10 years of normal retirement date and not eligible for unreduced early retirement.

Benefit

The benefit calculated under the normal retirement formula based on Highest Average Salary, Average CPP Maximum Salary, and Pensionable Service as of early retirement date, reduced 5% for each year that actual retirement precedes the normal retirement date.

Postponed Retirement Eligibility

Any age after normal retirement date, but for plan purposes pension benefits must commence no later than December 1 of the year in which the member's 71st birthday occurs.

¹ Only if retiring on December 31, on June 30

Benefit	The benefit calculated under the normal retirement formula based on Highest Average Salary, Average CPP Maximum Salary, and Pensionable Service as of postponed retirement date.
Disability Eligibility	If eligible (or deemed eligible) to receive disability income from Long-Term Disability Plan.
Benefit	<p>The benefit calculated under the normal retirement formula, payable at normal retirement date, based on Pensionable Service which continues to accrue during periods of disability and on salary which is increased during each year of disability by the lesser of:</p> <ul style="list-style-type: none">(a) 7%; and(b) The "across-the-board" economic increase granted to active employees during the preceding 12 months.
Termination of Service Eligibility	Any age
Benefit	<p>A terminating member may choose one of the following options:</p> <ul style="list-style-type: none">(a) A benefit calculated under the normal retirement formula based on Highest Average Salary, Average CPP Maximum Salary, and Pensionable Service at termination date, payable at normal retirement date (or actuarially reduced for early commencement).(b) A transfer of the commuted value of the accrued benefit to a new employer's pension plan, another prescribed retirement savings vehicle, or a life insurance company to purchase an annuity (provided the funds are transferred on a "locked-in" basis). For terminations after July 1, 2019 but prior to early retirement age, the minimum termination benefit will be two times the member's required contributions made prior to July 1, 2019 with interest.

Death in Service

Eligibility

Any age

Benefit

Lump-sum death benefit equal to the commuted value of the accrued benefit calculated under the normal retirement formula above based on Highest Average Salary, Average CPP Maximum Salary, and Pensionable Service at date of death. If the beneficiary is the spouse, the spouse shall receive an immediate pension unless he or she chooses a lump-sum cash payment, a transfer to an RRSP or RRIF, or a deferred pension. A beneficiary who is not a spouse, or an estate, shall receive the benefit as a single lump-sum cash payment.

Normal Form of Pension

The normal form for members with a spouse at pension commencement date is a life annuity with 60% continuing thereafter to the surviving spouse for his or her lifetime. If the spouse is more than 15 years younger than the member, the pension will be actuarially reduced to reflect the number of years in excess of 15 that the spouse is younger than the member. A survivor's pension is payable to a member's dependent children under certain circumstances.

For members without a spouse at pension commencement date, the normal form is a life annuity with a five-year guarantee period.

For members who terminated prior to July 1, 1996 and are entitled to a future pension under the Plan, the normal form will be determined based on the Plan provisions in effect at the time of termination.

Cost-of-Living Adjustments

Pensions in payment, and pensions in the deferral period for members who terminated service on or after July 1, 1982, will be increased on July 1 each year by the greater of (a) and (b) prorated to reflect the number of months from pension commencement date to the July 1:

- (a) The increase in the CPI for Canada for the previous calendar year minus 4.0%; or
- (b) 75% of the increase in the CPI for the previous calendar year to a maximum CPI increase of 8%, plus 60% of the increase in CPI in excess of 8%.

Definitions

Average CPP Maximum Salary	The average of the CPP Maximum Salary during the last 36 months of participation.
CPP Maximum Salary	The maximum salary taken into account for purposes of the Canada Pension Plan (i.e., the Year's Maximum Pensionable Earnings) as at the beginning of a University Year.
Credited Interest ¹	4% per annum up to June 30, 1981; after June 30, 1981, an annual rate equal to the increase in the CPI plus 2% subject to the minimum rate prescribed by the <i>Pension Benefits Act</i> (Ontario) and its Regulations; from July 1, 2012 onward, the increase in CPI plus 2% is removed.
Highest Average Salary	The highest average of the Salary received by a member during any 36 completed months of participation. Highest Average Salary is capped at the level at which the <i>Income Tax Act</i> maximum pension is reached in the month of retirement or earlier termination.
Pensionable Service	Member's years and completed months of continuous service with the University while a member of the University of Toronto Pension Plan up to and including June 30, 2021. For service of a member employed on a full-time basis or the service on or after July 1, 1987 of a member employed on a part-time basis, the period of service is multiplied by the percentage appointment.
Salary	Gross regular salary/wages including academic administrative stipends, but excluding all other payments.
University Year	The period of 12 consecutive months commencing on July 1.

¹ Applies to contribution balances up to and including June 30, 2021

Queen's University—Provisions for Pre-Conversion Date Service

The following is a summary of the main provisions that apply to pre-conversion date service for members accruing benefits under the Revised Pension Plan of Queen's University as of June 30, 2021 and for whom pension benefit entitlements have been transferred to the UPP effective July 1, 2021. The provisions of the Revised Pension Plan of Queen's University in effect on June 30, 2021 apply to the pension benefit entitlements for pensioners, beneficiaries and deferred vested members transferred to the UPP effective July 1, 2021.

Conversion Date	July 1, 2021
Normal Retirement Eligibility	Last day of the month coincident with or in which the member attains age 65.
Benefit	<p>Money Purchase Pension Pension that can be provided by the member's Money Purchase Account balance (member and University money purchase contributions up to and including June 30, 2021, credited with Fund Interest to retirement date) based on actuarial tables in force on retirement date. Account balance is reduced by a charge to account for the cost of the non-reduction pension currently 4.50% of the total account balance.</p> <p>Minimum Guarantee Pension The excess, if any, of (a) over (b):</p> <p>(a) 1.40%¹ of Final Average Earnings up to Average YMPE plus 1.80% of Final Average Earnings in excess of Average YMPE multiplied by Credited Service up to and including June 30, 2021</p> <p>(b) Money Purchase Pension</p>
Unreduced Early Retirement Eligibility	Age 60 and age-plus-Eligibility Service ² totaling 80 or more.
Benefit	Pension calculated under normal retirement formula based on Money Purchase Account balance at early retirement date and Minimum Guarantee Pension based on Final Average Earnings, Final Average YMPE and Credited Service at early retirement date, without reduction for early commencement.

¹ 1.35% for Credited Service before September 1, 1997

² Same definition as for benefits earned for post-conversion date service

Reduced Early Retirement

Eligibility

Any age and not eligible for unreduced early retirement.

Benefit

Pension calculated under normal retirement formula based on Money Purchase Account balance at early retirement date and Minimum Guarantee Pension based on Final Average Earnings, Final Average YMPE and Credited Service at early retirement, reduced as follows:

- For Minimum Guarantee Pension accrued as of September 1, 2012, 2% per year for the first five years prior to normal retirement date and 6% per year for each additional year prior to normal retirement date.
- For Minimum Guarantee Pension accrued on or after September 1, 2012, if early retirement date is within 10 years prior to normal retirement date, 3% per year for the first five years, prior to normal retirement date and 6% per year for each additional year prior to normal retirement date; otherwise 6% per year from normal retirement date.

Postponed Retirement

Eligibility

Any age after normal retirement date, but for plan purposes benefits must commence no later than December 1 of the year in which the member's 71st birthday occurs.

Grandparenting: A member who has attained normal retirement date as of July 1, 2021 and has elected to cease contributing at or after normal retirement date.

Benefit

Pension calculated under normal retirement formula based on Money Purchase Account balance at postponed retirement date and Minimum Guarantee Pension based on Final Average Earnings, Final Average YMPE and Credited Service at postponed retirement date.

Grandparenting: Minimum Guarantee Pension is calculated at contribution cessation date based on Final Average Earnings, Final Average YMPE and Credited Service at contribution cessation date, actuarially increased to postponed retirement date.

Termination of Service

Eligibility

Any age

Benefit

Member may elect to transfer the Money Purchase Account plus the excess, if any, of the commuted value of the Minimum Guarantee Pension determined based on Final Average Earnings, Final Average YMPE and Credited Service at termination date, over the Money Purchase Account, to a new

employer's pension plan, another prescribed retirement savings vehicle or a life insurance company to purchase an annuity (provided the funds are transferred on a "locked-in" basis).

A terminating member is also entitled to a lump-sum refund of any voluntary or special lump-sum contributions, in cash or as a transfer to a retirement savings arrangement (on a "non-locked-in" basis).

Death in Service

Eligibility

Any age

Benefit

Lump-sum benefit equal to Money Purchase Account balance plus the excess, if any, of the commuted value of the Minimum Guarantee Pension based on Final Average Earnings, Final average YMPE and Credited Service after January 1, 1987 to date of death, over the Money Purchase Account balance in respect of service after January 1, 1987. Any voluntary or special lump-sum contributions would be refunded.

Maximum Benefit

The annual pension determined in accordance with the Minimum Guarantee Pension formula prior to the reduction for the Money Purchase Pension cannot exceed the lesser of (1) and (2) below.

- (1) The defined benefit limit as defined under the *Income Tax Act* times Credited Service; and
- (2) 2.0% of the average of the best three consecutive years' earnings times Credited Service.

For commencement of the pension after normal retirement date, the amount shall be increased on an actuarially equivalent basis in the manner permitted by the *Income Tax Act*.

For commencement of the pension prior to normal retirement date, for the maximum pension earned for Credited Service up to September 1, 2012, the early retirement reductions under the *Income Tax Act* will apply. For the maximum pension in respect of Credited Service on or after September 1, 2012, the maximum pension is applied to the normal retirement formula with the plan's early retirement reductions then applied.

Normal Form of Pension

The normal form of annuity is a life annuity with a 10-year guarantee. For members with a spouse at pension commencement date, legislated 60% survivor pension on an actuarially equivalent basis.

Excess Interest Indexation

For pensioners retiring prior to or on September 1, 2012:

- Pensions in payment will be adjusted each September 1 by the excess, if any, of the 4-year average of the Fund Interest over 6%. No reduction will be made even if the 4-year average of the Fund Interest is less than 6%.

For pensioners retiring after September 1, 2012:

- Pensions in payment from the Money Purchase Pension and the prorated portion of the Minimum Guarantee Pension in respect of Credited Service prior to September 1, 2012 will be adjusted each September 1 by the excess, if any, of the 6-year average Fund Interest in excess of 6%. For this purpose, the Fund Interest rate for periods prior to the retirement date will be set at 6%. The indexation will be adjusted either positively or negatively to reflect actual mortality gains or losses. No reduction will be made if the 6-year average of the Fund Interest combined with the mortality adjustments is less than 6%.

Definitions

Credited Service	Years and fraction of years during which the member contributes at the full rate based on contributory earnings for the year. For a part-time member, determined by taking the ratio of the member's actual contributions to the contributions that would normally be required if contributory earnings were adjusted to a full-time basis.
Earnings	Regular earnings from the University, excluding overtime, special supplements, summer school, extramural and similar payments.
Final Average Earnings	Average of the member's Earnings during 48 consecutive months of highest Earnings, or if less, total period service.
Final Average YMPE	Average of the Year's Maximum Pensionable Earnings under the Canada Pension Plan for the same 48 months as used for the Final Average Earnings.
Fund Interest	Interest at a rate calculated as of the close of each plan year based on the pension fund earnings including interest and dividends, capital gains and losses (both realized and unrealized), less administrative expense incurred in the operation of the pension fund.

University of Guelph—Provisions for Pre-Conversion Date Service

The following is a summary of the main provisions that apply to pre-conversion date service for members accruing benefits under the University of Guelph Pension Plans as of June 30, 2021 and for whom pension benefit entitlements have been transferred to the UPP effective July 1, 2021. The provisions of the University of Guelph Pension Plans as in effect on June 30, 2021 apply to the pension benefit entitlements for pensioners, beneficiaries and deferred vested members transferred to the UPP effective July 1, 2021.

Conversion Date July 1, 2021

Normal Retirement

Eligibility Last day of the month coincident with or in which the member attains age 65

Benefit Annual benefit equal to (a) plus (b) below for each year of Credited Service up to and including June 30, 2021:

(a) 1.50%* of Best Average Earnings up to YMPE Average.

(b) 2.00% of Best Average Earnings in excess of YMPE Average.

*1.60% for USW, OSSTF, CUPE 1334 and Exempt

Maximum Pension

The annual benefit for a member cannot exceed the lesser of:

- Defined benefit limit on such date times years of Credited Service; and
- 2.00% of the average of the best three consecutive years of salary times Credited Service.

Regulation 8504(6) imposes a lower maximum benefit limit in respect of any pre-1990 service that is granted after June 8, 1990.

Unreduced Early Retirement

Eligibility Multiple provisions depending on employee group based on age and age-plus-Credited Service points.

Age 55 and 85 points for:
USW, CUPE 1334, CUPE 1334 Unit 1, CUPE 3913 Unit 2,
UGFSEA Unit 1, UGFSEA Unit 2, ONA

Age 55 and 85 points for pension benefits earned for Credited Service prior to Earliest Unreduced Retirement Change Date, and the following for pension benefits earned for Credited Service after that date:

Age 60 and 90 points with Change Date of September 1, 2011 for: UFGA Unit 2.

Age 60 and 90 points with Change Date of May 1, 2013 for: Exempt, OPSEU, OSSTF and UNIFOR

Age 60 and 90 points with Change Date of July 1, 2013 for: USW TESL and Non-Represented Members

Age 60 and 85 points with Change Date of July 1, 2013 for: P&M

Age 62 and 87 points with Change Date of July 1, 2013 for: UGFA, Executive.

Benefit

The benefit calculated under the normal retirement formula based on Best Average Earnings, YMPE Average and Credited Service as of early retirement date, without reduction for early commencement.

Reduced Early Retirement

Eligibility

Last day of the month coincident with or in which the member attains age 55, and not eligible for unreduced early retirement.

Benefit

The benefit calculated under the normal retirement formula based on Best Average Earnings, YMPE Average and Credited Service as of early retirement date, reduced 3% for each year that early retirement date precedes the earliest of:

- (a) normal retirement date; and
- (b) the earliest unreduced retirement date had the member remained in employment.

Postponed Retirement

Eligibility

Any age after normal retirement date that the member terminates employment, but for plan purposes, pension benefits must commence no later than December 1 of the year in which the member's 71st birthday occurs.

Benefit

The benefit calculated under the normal retirement formula based on Best Average Earnings, YMPE Average and Credited Service as of postponed retirement date.

Disability

Eligibility

If eligible (or deemed eligible) to receive disability income from Long-Term Disability Plan.

Benefit

The benefit calculated under the normal retirement formula, payable at normal retirement date, based on Credited Service that continues to accrue during periods of disability and on earnings which are increased annually to reflect the increase in the base salary level for the member's union, association, or group as applicable.

Termination of Service

Eligibility

Any age prior to eligibility for early retirement.

Benefit

A terminating member may choose one of the following options:

- (a) A benefit calculated under the normal retirement formula above based on Best Average Earnings, YMPE Average, and Credited Service at termination date, payable at normal retirement date or as early as 10 years prior to normal retirement date reduced for early commencement as shown below.
- (b) A transfer of the commuted value of the accrued benefit to a new employer's pension plan, another prescribed retirement savings vehicle, or a life insurance company to purchase an annuity (provided the funds are transferred on a "locked-in" basis).

For pension benefits in respect of Credited Service up to the Termination Benefit Change Date in the following table, the reduction for early commencement is 3% for each year that the pension commencement date precedes the earlier of the normal retirement date and the date on which the member would have attained the 85 age-plus-Credited Service points had they remained in employment.

Termination Benefit Change Dates:

Date	Employee Group
September 1, 2011	UGFA Unit 2
January 1, 2012	USW, UGFSEA Unit 2
May 1, 2012	UGFSEA Unit 1
June 1, 2012	ONA
July 1, 2012	UGFA, P&M
May 1, 2013	OPSEU, UNIFOR, OSSTF, Exempt
July 1, 2013	USW TESL, Non-Represented, Executive
April 30, 2016	CUPE 1334, CUPE 1334 Unit 1
September 1, 2016	CUPE 3913 Unit 2

For service up to the Termination Benefit Change Date, the minimum lump-sum transfer is two times the member's contributions with interest.

For pension benefit in respect of Credited Service after the Termination Benefit Change Date, on early commencement, an actuarial reduction from normal retirement date is applied.

Death in Service

Eligibility

Any age

Benefit

Lump-sum death benefit equal to the commuted value of the accrued benefit calculated under the normal retirement formula above based on Best Average Earnings, YMPE Average and Credited Service at date of death. If the beneficiary is the spouse, the spouse shall receive an immediate pension unless they choose a lump-sum cash payment, a transfer to an RRSP or RRIF, or a deferred pension. A beneficiary who is not a spouse, or an estate, shall receive the benefit as a single lump-sum cash payment.

Normal Form of Pension

The normal form for members with a spouse at pension commencement date is a life annuity with 60% continuing to the surviving spouse for their lifetime. If the spouse is more than five years younger than the member, the pension will be actuarially reduced to reflect the number of years in excess of five that the spouse is younger than the member. A survivor's pension is payable to a member's dependent children under certain circumstances.

For members without a spouse at pension commencement date, the normal form is a life annuity with a five-year guarantee period.

Cost-of-Living Adjustments

Pensions in payment will be increased on September 1 each year by (a) less (b) below, prorated to reflect the number of months from pension commencement date to the September 1:

- (a) Increase in CPI up to a maximum of 8.00%.
- (b) 2.00%

Increase in CPI is measured by the percentage by which the average of the CPI Canada over the 12-month period ending in April of the year in which the adjustment is occurring exceeds the average of the CPI Canada over the preceding 12-month period.

Definitions

Best Average Earnings	Annualized average of the member's 36 consecutive months of Earnings prior to date of retirement, termination, or death.
Credited Service	Continuous service with the University during which regular contributions are made. Proportionate Credited Service is granted for part-time members. Limited to 35 years for Credited Service up to and including June 30, 2021.
Earnings	Basic earnings annualized for part-time members, including deferred income, excluding bonuses, overtime payments and other payments. For benefits for Pensionable Service on or after July 1, 2021 under the UPP, the following payments are included: stipends for administrative appointments, administrative honorariums, team leader pay, acting pay and market adjustments.
Interest ¹	Minimum rate prescribed by the <i>Pension Benefits Act</i> (Ontario) and its Regulations.
YMPE Average	Average of the Year's Maximum Pensionable Earnings under the Canada Pension Plan for the 60 consecutive months immediately prior to retirement, termination or death.

¹ Applies to contribution balances up to and including June 30, 2021

Trent University—Provisions for Pre-Conversion Date Service

The following is a summary of the main provisions that apply to pre-conversion date service for members accruing benefits under The Contributory Pension Plan for TUFA Employees of Trent University as of December 31, 2021 and for whom pension benefit entitlements have been transferred to the UPP effective January 1, 2022. The provisions of The Contributory Pension Plan for TUFA Employees of Trent University as in effect on December 31, 2021 apply to the pension benefit entitlements for pensioners, beneficiaries and deferred vested members transferred to the UPP effective January 1, 2022.

Conversion Date	January 1, 2022
Normal Retirement Eligibility	Last day of the month coincident with or in which the member attains age 65 (June 30 th coincident with or next following the attainment of age 65 for deferred vested members as of December 31, 2021)
Benefit	Annual benefit equal to 2% of Final Average Earnings for each year of Pensionable Service.
	<p>Maximum Pension</p> <p>The annual benefit for a participant cannot exceed the “defined benefit limit” under the <i>Income Tax Act</i> \$3,420.00 for 2022, and indexed each year thereafter, for each year of Pensionable Service.</p> <p>Regulation 8504(6) imposes a lower maximum benefit limit in respect of any pre-1990 service that is granted after June 8, 1990 (e.g., buyback or granting of years of pre-1990 service that was not previously counted as Pensionable Service).</p>
Unreduced Early Retirement Eligibility	Age 60 and age-plus-Eligibility Service ¹ totaling 80 or more.
Benefit	The benefit calculated under the normal retirement formula based on Final Average Earnings and Pensionable Service as of early retirement date, without reduction for early commencement.

¹ Same definition as for benefits earned for post-conversion date service

Reduced Early Retirement

Eligibility

Within 10 years prior to normal retirement date and not eligible for unreduced early retirement .

Benefit

The benefit calculated under the normal retirement formula based on Final Average Earnings and Pensionable Service as of early retirement date, reduced 6% for each year (1/2 of 1% for each month) that the member's actual retirement date precedes the member's normal retirement date.

Postponed Retirement

Eligibility

Any age after normal retirement date, but for plan purposes pension benefits must commence no later than December 1 of the year in which the member attains age 71.

Benefit

The benefit calculated under the normal retirement formula based on Final Average Earnings and Pensionable Service as of postponed retirement date.

Disability

Eligibility

Any age, and in receipt of Long-Term Disability benefits under a plan sponsored by Trent University.

Benefit

The benefit calculated under the normal retirement formula, payable at normal retirement date, based on Pensionable Service which continues to accrue during periods of disability and on Nominal Earnings which are increased during each year of disability by the lesser of the rate of increase the member would have received had they continued in active status and the indexation percentage that would have applied if they had terminated Continuous Service on the date the member became Disabled and elected a deferred pension (except the indexation rate applicable to earnings of members who are Disabled on or after July 1, 2006 is the greater of the rate applicable to retirements and terminations on and after July 1, 2006 and the rate applicable to retirements and terminations before July 1, 2006).

Termination of Service

Eligibility

Any age prior to eligibility for early retirement.

Benefit

A terminating member may choose one of the following options:

(a) A benefit calculated under the normal retirement formula above based on Final Average Earnings and Pensionable Service at termination date, payable at normal retirement date (or actuarially reduced for early commencement).

(b) **For Service Prior to July 1, 2010**

A transfer of the greater of (i) two times the participant's required contributions with interest and (ii) the commuted value of the benefit accrued prior to July 1, 2010, to a new employer's pension plan, an individual Registered Retirement Savings Plan (RRSP), or other prescribed vehicle (provided the funds are transferred on a "locked-in" basis).

For Service From July 1, 2010

The commuted value of the benefit accrued after July 1, 2010, to a new employer's pension plan, an individual Registered Retirement Savings Plan (RRSP), or other prescribed vehicle (provided the funds are transferred on a "locked-in" basis).

A member who has Non-Locked-In pension benefits may elect to receive such benefits, in lieu of the benefit described in (a) above, in a single lump-sum cash payment or to transfer such benefits to a retirement vehicle that does not require benefits to be locked-in.

Death in Service

Eligibility

(a) Any age prior to normal retirement date.

(b) On or after normal retirement date.

Benefit

(a) Commuted value of accrued normal retirement pension. Surviving spouse may take commuted value in the form of an immediate or deferred monthly pension.

(b) Survivor benefit based on accrued normal retirement benefit as if member retired immediately prior to date of death and under normal form of payment applicable to the member on date of death. Commuted value of this survivor benefit shall be no less than the commuted value otherwise payable under (a) above.

Death in Deferred Status

Actuarial equivalent to benefit payable at normal retirement date.

Normal Form of Annuity

The normal form for members with a spouse at pension commencement date is a life annuity with 60% continuing to a surviving spouse for their lifetime. If the spouse is more than five years younger than the member, the pension will be reduced by 0.5% of each complete year in excess of five that the spouse is younger than the member.

For members without a spouse at pension commencement date, the normal form is a life annuity with a 10-year guarantee period.

Indexation for Retirements and Terminations Prior to July 1, 2006

Pensions in payment, and pensions in deferral period for terminated members, will be increased as of each July 1 by the amount of indexation that can be provided by the Excess Investment Earnings of the pension fund.

Increases to pensions in payment as of July 1 will not exceed the annual increase in the Consumer Price Index determined as of the immediately preceding March 31.

Increases to deferred pensions as of July 1 shall not exceed the lesser of the increase in the Consumer Price Index and the increase in the Average Industrial Wage, both determined as of the immediately preceding March 31.

Where the Excess Investment Earnings are more than sufficient to provide full indexation in a Plan Year, the excess will be used to provide increases in respect of any prior Plan Years where the Excess Investment Earnings were insufficient to provide full indexation. If the Excess Investment Earnings are negative, there will be no indexation; however, there will be no reduction in pension benefits.

Indexation for Retirements and Terminations On and After July 1, 2006

Pensions in payment, and pensions in deferral period for terminated members will be increased as of each July 1 by the amount of indexation that can be provided by the Cumulative Excess Investment Earnings of the pension fund.

Increases to pensions in payment as of July 1 will not exceed 50% of the annual increase in the Consumer Price Index determined as of the immediately preceding March 31.

Increases to deferred pensions as of July 1 shall not exceed 50% of the lesser of the increase in the Consumer Price Index and the increase in the Average Industrial Wage, both determined as of the immediately preceding March 31.

Where the Cumulative Excess Investment Earnings are more than sufficient to provide the above indexation in a Plan Year, the excess will be used to provide increases in respect of any one or more of the previous five Plan Years, up to the maximum amounts shown above (applied in reverse chronological order).

In all cases above, the percentage expended on indexation will be deducted from the Cumulative Excess Investment Earnings.

If the Cumulative Excess Investment Earnings are negative, there will be no indexation; however, there will be no reduction in pension benefits.

Definitions

Continuous Service

Most recent period of uninterrupted employment with Trent University. Unpaid periods of leave and lay-off shall not cause an interruption in Continuous Service.

Cumulative Excess Investment Earnings

Determined as of each April 1 in respect of indexing adjustments effective on the immediately following July 1, for retirements and terminations on and after July 1, 2006.

Equal to the percentage value that is the cumulative excess/deficiency of the average annualized rate of return on the pension fund (on a market value basis), net of fund expenses, above/below 6.50% for the four-year period ending on the immediately preceding March 31, with the starting measurement date for the rate of return and the cumulative excess/deficiency being April 1, 2006. Transitionally, for the four 12-month periods from April 1, 2006 to March 31, 2010, the rate of return will be the one-year, two-year, three-year and four-year averages respectively.

Earnings

Gross annual salary, excluding living allowances, additional payments for research, stipends, grants-in-aid, and additional remuneration for part-time teaching, as determined by the payroll records of the University. Earnings above the D22 salary cap are excluded.

Excess Investment Earnings

Determined as of each April 1 in respect of indexing adjustments effective on the immediately following July 1, for retirements and terminations before July 1, 2006.

Equal to the amount by which the average annualized rate of return on the pension fund (on a market value basis), net of fund expenses, over the four-year period ending on the immediately preceding March 31 exceeds 6.0%. In no event will Excess Investment Earnings be less than 0%.

Final Average Earnings	<p>The highest average of the regular Nominal Earnings paid to a member during any three consecutive years out of the last 10 years immediately preceding retirement, termination of employment, or death.</p> <p>Effective July 2, 2014, the definition of final average earnings will be changed from three consecutive years to five consecutive years. In no event will the final average earnings be less than the final average earnings as of June 30, 2014.</p>
Interest	Minimum rate prescribed by the <i>Pension Benefits Act</i> (Ontario) and its Regulations.
Pensionable Service	Member's years of Continuous Service while the participant contributed to the Plan, the Previous Plan or the Prior Plan, expressed to three decimal places. Includes periods during which the participant is on long-term disability or on an approved leave during which service is credited or past service purchased or transferred from another plan.
Nominal Earnings	Rate of Earnings as if participant worked full-time for a full year, but earnings above the D22 salary cap are excluded.
Non-locked-in	Pension benefits earned prior to January 1, 1987 in respect of Pensionable Service prior to January 1, 1987 for a member who has not both attained age 45 and completed at least 10 years of Continuous Service; and Pension benefits earned on or after January 1, 1987 in respect of Pensionable Service prior to, on and after January 1, 1987 for a member who has not completed at least two years of Continuous Service while a member.
Plan Year	July 1 to June 30.
Prior Plan	The Contributory Pension Plan for Employees of Trent University.

Appendix F: Administrator Certification

With respect to the University Pension Plan Ontario, forming part of the actuarial report as at January 1, 2022, I hereby certify that, to the best of my knowledge and belief:

- The terms of engagement contained in Section 1 of this report are accurate and reflect the Board of Trustee's direction;
- The asset data provided or made available to the actuary are complete and accurate;
- The plan provisions provided or made available to the actuary are complete and accurate;
- The membership data and subsequent query answers provided or made available to the actuary are complete and accurate for all persons who are entitled to benefits under the terms of the Plan in respect of service up to the date of the valuation; and
- The actuary has been notified of all relevant events subsequent to the valuation measurement date.

Barbara Zvan

Name (print) of Authorized Signatory



Signature

CEO & President

Title

September 15, 2022

Date

About Aon

Aon plc (NYSE:AON) is a leading global professional services firm providing a broad range of risk, retirement and health solutions. Our 50,000 colleagues in 120 countries empower results for clients by using proprietary data and analytics to deliver insights that reduce volatility and improve performance.

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