



Asset Transfer and Conversion Actuarial Valuation as at July 1, 2021 for University of Toronto Pension Plan

Regulatory Registration Number: 0312827

January 2022

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Executive Summary

On November 12, 2020, the Chief Executive Officer of the Financial Services Regulatory Authority of Ontario ("FSRA") consented to the conversion of the University of Toronto Pension Plan ("Plan") from a single employer pension plan to a jointly sponsored pension plan, effective July 1, 2021, through the transfer of assets and liabilities of the Plan to the University Pension Plan Ontario ("UPP"), pursuant to s. 80.4 of the *Pension Benefits Act* (Ontario). The UPP is registered with FSRA and the Canada Revenue Agency ("CRA") under registration number 1357243 and is a listed plan under s.1.3.1(3) of Ontario Regulation 909 to the *Pension Benefits Act* (Ontario). Effective July 1, 2021, members of the Plan became members of the UPP and begin accruing pension benefits under the provisions of the UPP in the case of active members and began receiving their pensions from the UPP in the case of retired members and beneficiaries. The effective date of the transfer of assets and liabilities of the Plan to the UPP was July 1, 2021 and the actual date of the transfer of assets was July 1, 2021.

This actuarial valuation as of July 1, 2021 constitutes the asset transfer report required under s.10 of Ontario Regulation 311/15 and the Transfer and Conversion Report required under the Transfer Agreement between the Joint Sponsors of the UPP and The Governing Council of the University of Toronto ("Transfer Agreement").

Summary of Principal Results

Financial Position

	July 1, 2021	July 1, 2020
Going Concern Basis		
Assets	\$ 6,866,089,000	\$ 5,473,636,000
Liabilities	<u>6,137,957,000</u>	<u>5,867,924,000</u>
Financial Position	\$ 728,132,000	\$ (394,288,000)
Adjustments ²	<u>(822,637,000)¹</u>	<u>(537,330,000)</u>
Surplus/(Unfunded Liability)	\$ (94,505,000)	\$ (931,618,000)
UPP Transfer Basis		
Assets	\$ 6,866,089,000	
Liabilities	<u>6,073,545,000</u>	
Surplus/(Unfunded Liability)	\$ 792,544,000	

¹ PfAD determined on a "closed plan" basis; corresponding PfAD on an "open plan" basis would have been \$517,465,000

	July 1, 2021	July 1, 2020
Solvency Basis		
Assets ¹	\$ 6,864,689,000	\$ 5,472,236,000
Liabilities	<u>7,023,262,000</u>	<u>7,415,778,000</u>
Financial Position	\$ (158,573,000)	\$ (1,943,542,000)
Adjustments ²	<u>-</u>	<u>701,952,000</u>
Surplus/(Unfunded Liability)	\$ (158,573,000)	\$ (1,241,590,000)
Hypothetical Wind Up Basis		
Assets ¹	\$ 6,864,689,000	\$ 5,472,236,000
Liabilities	<u>9,766,462,000</u>	<u>9,759,569,000</u>
Surplus/(Unfunded Liability)	\$ (2,901,773,000)	\$ (4,287,333,000)

Legislative Ratios

	July 1, 2021	July 1, 2020
Going Concern Funded Ratio (without PfAD)	1.12	0.93
Going Concern Funded Ratio (with PfAD)	0.99	0.85
Solvency ratio	0.98	0.74
Transfer ratio	0.70	0.56

Membership Data

	July 1, 2021	July 1, 2020
Active and Disabled Members ³	11,779	11,010
Retirees and Beneficiaries	6,607	6,410
Deferred Vested Members	3,509	3,449
Pending/Suspended/Exempt Members	<u>44</u>	<u>83</u>
Total	21,939	20,952

¹ Net of estimated wind up expenses

² Adjustments include Provision for Adverse Deviations, prior year credit balance, and all solvency liability and solvency asset adjustments, where applicable

³ Includes members on leaves of absence

Key Assumptions

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

Going Concern Basis	July 1, 2021	July 1, 2020
Discount rate	5.60% per year	5.35% per year
Provision for adverse deviations	15.50% of non-indexed liabilities (closed plan)	10.49% of non-indexed liabilities (open plan)
Inflation rate	2.00% per year	1.75% per year
Pensionable earnings	4.00% per year	3.75% per year
Cost-of-living adjustment	1.50% per year	1.3125% per year
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
UPP Transfer Basis	July 1, 2021	
Discount rate	5.60% per year	
Inflation rate	2.00% per year	
Pensionable earnings	4.00% per year	
Cost-of-living Adjustment	1.50% per year	
Mortality table	95% of 2014 Canadian Public Sector Pensioners' Mortality Table with mortality improvement scale MI-2017 from 2014	
Retirement rates	Age-related table	

**Solvency/
Hypothetical Wind Up
Basis**

July 1, 2021

July 1, 2020

Discount rate (non-indexed)	Annuity purchases: 3.00% per year Transfers: 1.80% per year for 10 years; 3.30% per year thereafter	Annuity purchases: 2.50% per year Transfers: 1.30% per year for 10 years; 2.20% per year thereafter
Discount rate (indexed)	Annuity purchases: 0.45% per year Transfers: 1.00% per year for 10 years; 1.70% per year thereafter	Annuity purchases: 0.25% per year Transfers: 1.00% per year for 10 years; 1.20% per year thereafter
Pensionable earnings increase	Not applicable	Not applicable
Mortality table	2014 Canadian Pensioners Mortality Table (Combined) with generational improvements using scale CPM-B	2014 Canadian Pensioners Mortality Table (Combined) with generational improvements using scale CPM-B

Section 1: Introduction

Purpose and Terms of Engagement

We have been engaged by the University of Toronto, and hereafter referred to as the University, to conduct an actuarial valuation of the Plan, registered in Ontario, as at July 1, 2021. The purposes of the valuation are to:

- Determine the financial position of the Plan as at July 1, 2021 on a going concern, solvency and hypothetical wind up basis before the transfer of assets based on the actuarial assumptions and methods summarized herein;
- Determine the amount of assets to be transferred from the Plan to the UPP as at July 1, 2021, the effective date of the asset transfer, in accordance with Ontario Regulation 311/15;
- Determine the liabilities of the Plan on a going concern basis using the actuarial assumptions and methods specified in Schedule 1 to the Transfer Agreement; 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 University, the committees involved in the governance of the Plan, the associations and unions representing Plan members, the Joint Sponsors and the Board of Trustees of the UPP, and FSRA and CRA.

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

This report will be the final actuarial valuation of the Plan.

Summary of Changes Since the Last Valuation

The last actuarial valuation in respect of the Plan was performed as at July 1, 2020. Since the time of the last valuation, we note that the following events have occurred:

- As a result of Amendment No. 1 to the Plan effective July 1, 2021, which closes the Plan to new entrants, ceases pension accruals and provides for the transfer of assets and liabilities of the Plan to the UPP, the Plan is considered a Closed Plan for purposes of determining the Provision for Adverse Deviations (“PfAD”).
- Effective July 1, 2021, the discount rate was changed from 5.35% per year to 5.60% per year and the increase in the Consumer Price Index was changed from 1.75% per year to 2.00% per year, maintaining the real rate of return at 3.60% per year. All related economic assumptions were also increased by 0.25% per year accordingly (increases in pensionable earnings, increases in CPP maximum salary, increases in *ITA* maximum pension limit).

University Information and Inputs

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

- A copy of the previous valuation report as at July 1, 2020;
- A copy of the Statement of Investment Policies and Procedures for the Plan;
- Membership data compiled as at July 1, 2021 by the University;
- Asset data taken from the Plan's audited financial statements as of June 30, 2021;
- A copy of the latest Plan text and amendments up to and including July 1, 2021; and
- A copy of the Transfer Agreement including the actuarial assumptions and methods provided in Schedule 1.

We have been further advised that the conditions precedent to the cancellation of special payments pursuant to s.17 of Ontario Regulation 311/15 were met and as such, there are no special payment requirements to be reported under this actuarial valuation. We have been provided with the certification by the University, as administrator of the Plan, that all scheduled special payments up to July 1, 2021 have been paid to the Plan.

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 July 1, 2021 will result in gains or losses which will be reflected in future valuations of the transferred assets and liabilities under the UPP.
- 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 Plan as at July 1, 2021.
- 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 as result of such changes will be reflected in future valuations of the transferred assets and liabilities under the UPP.

Section 2: Going Concern Valuation Results

Going Concern Financial Position of the Plan

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

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

On the basis of the Plan provisions, membership data, going concern assumptions and methods, and asset information described in the Appendices, the going concern financial position of the Plan as at July 1, 2021 is shown in the following table. The results as at July 1, 2020 are also shown for comparison purposes.

Going Concern Financial Position

	July 1, 2021	July 1, 2020
Market Value of Assets	\$ 6,866,089,000	\$ 5,473,636,000
Going Concern Liabilities		
Active and Disabled Members	\$ 3,051,785,000	\$ 2,885,041,000
Retirees and Beneficiaries	2,821,351,000	2,724,010,000
Deferred Vested Members	264,315,000	257,350,000
Pending/Suspended/Exempt Members	<u>506,000</u>	<u>1,523,000</u>
Total Liabilities	\$ 6,137,957,000	\$ 5,867,924,000
Going Concern Position	\$ 728,132,000	\$ (394,288,000)
Additional liabilities due to PfAD	<u>822,637,000</u>	<u>537,330,000</u>
Surplus/(Unfunded Liability) (before prior year credit balance)	\$ (94,505,000)	\$ (931,618,000)
Prior year credit balance	<u>-</u>	<u>-</u>
Surplus/(Unfunded Liability)	\$ (94,505,000)	\$ (931,618,000)
Going Concern Funded Ratio (without PfAD)	1.12	0.93
Going Concern Funded Ratio (with PfAD)	0.99	0.85

The PfAD is not required to be applied to the liabilities in respect of post-employment indexation of \$830,619,000 as at July 1, 2021 and \$745,619,000 as at July 1, 2020. The PfAD as of July 1, 2021 has been prepared on a "closed plan" basis. The corresponding PfAD determined on an "open plan" basis would have been \$517,465,000.

Change in Financial Position

The major components of the change in the Surplus/(Unfunded Liability) for the period from July 1, 2020 to July 1, 2021 are summarized in the following table.

Surplus/(Unfunded Liability) as at July 1, 2020	\$ (931,618,000)
University special payments in inter-valuation period	99,104,000
Interest on (Unfunded Liability) and special payments	(47,226,000)
Expected Surplus/(Unfunded Liability) as at July 1, 2021	\$ (879,740,000)
Change in financial position due to experience gains/(losses)	
Gain/(loss) from investment earnings	\$ 1,020,515,000
Gain/(loss) due to salary increases	(22,535,000)
Gain/(loss) on YMPE increase	4,178,000
Gain/(loss) on <i>ITA</i> maximum pension increase	(31,176,000)
Gain/(loss) due to indexation experience	22,204,000
Gain/(loss) due to retirement experience	(13,469,000)
Gain/(loss) due to mortality experience	(4,961,000)
Gain/(loss) due to change in status	2,839,000
Gain/(loss) due to termination experience	(8,226,000)
Gain/(loss) on contributions/new entrants	3,513,000
Gain/(loss) on service/transfer-in	(697,000)
Gain/(loss) on data corrections	4,485,000
Gain/(loss) on Provision for Adverse Deviations	(235,240,000)
Net gain/(loss) due to other experience and miscellaneous items	(871,000)
Surplus/(Unfunded Liability) After Experience Gains/(Losses) as at July 1, 2021	\$ (139,181,000)
Decrease due to change in assumptions	57,700,000
Increase due to methodology changes	(13,024,000)
Surplus/(Unfunded Liability) as at July 1, 2021	\$ (94,505,000)

Discussion of Changes in Assumptions

Effective July 1, 2021, the following assumptions were changed:

- The discount rate was changed from 5.35% per year to 5.60% per year and the increase in the Consumer Price Index was changed from 1.75% per year to 2.00% per year, maintaining the real rate of return at 3.60% per year. All related economic assumptions were also increased by 0.25% per year accordingly (increases in pensionable earnings, increases in CPP maximum salary, increases in *ITA* maximum pension limit). These changes in assumptions decreased the going concern liabilities by \$57,700,000.

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 (prior to the application of the Provision for Adverse Deviations) of using a discount rate 1% lower and 1% higher than that used for the going concern valuation.

July 1, 2021	Effect	
	\$	%
Going concern liabilities	\$ 6,137,957,000	
Going concern liabilities (discount rate – 1%)	\$ 7,146,122,000	1,008,165,000 16.4%
Going concern liabilities (discount rate + 1%)	\$ 5,345,874,000	(792,083,000) -12.9%

Plausible Adverse Scenarios

Given that the assets and liabilities of the Plan have been transferred to the UPP effective as of July 1, 2021, scenarios of adverse but plausible assumptions have not been prepared for this actuarial valuation.

Section 3: UPP Transfer Valuation Results

UPP Transfer Valuation

The Transfer Agreement requires an actuarial valuation of the liabilities to be transferred to the UPP, based on a specified set of actuarial assumptions and methods which are provided in Schedule 1 to the Transfer Agreement. These liabilities are then compared to the market value of assets to be transferred from the Plan to the UPP to determine the financial position of the UPP as of July 1, 2021 in respect of the assets and liabilities to be transferred from the Plan to the UPP.

On the basis of the Plan provisions, membership data, UPP transfer assumptions and methods, and asset information described in the Appendices, the going concern financial position of the Plan on the UPP transfer basis as at July 1, 2021 is shown in the following table.

Going Concern Financial Position on UPP Transfer Basis

	July 1, 2021
Market Value of Assets	\$ 6,866,089,000
UPP Transfer Liabilities	
Active and Disabled Members	\$ 2,961,747,000
Retirees and Beneficiaries	2,846,661,000
Deferred Vested Members	264,631,000
Pending/Suspended/Exempt Members	506,000
Total Liabilities	\$ 6,073,545,000
Going Concern Position on UPP Transfer Basis	\$ 792,544,000

Asset Transfer Amount

Pursuant to the Transfer Agreement and s.15 of Ontario Regulation 311/15, since the market value of assets of the Plan is less than the hypothetical wind-up liabilities, the full market value of assets of \$6,866,089,000 was transferred from the Plan to the UPP on July 1, 2021 and no assets remain in the Plan.

Section 4: Solvency Valuation Results

Solvency Financial Position of the Plan

The solvency valuation is a financial assessment of the Plan 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 Plan'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 of the Plan. 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*. All assumptions for the solvency valuation are listed in Appendix E.

On the basis of the Plan provisions, membership data, solvency assumptions and methods and asset information described in the Appendices, as well as the requirements of the *Act*, the solvency financial position of the Plan as at July 1, 2021 is shown in the following table. The solvency financial position of the Plan as at July 1, 2020 is shown for comparison purposes.

Solvency Financial Position

	July 1, 2021	July 1, 2020
Assets		
Solvency assets	\$ 6,866,089,000	\$ 5,473,636,000
Estimated wind up expenses	<u>(1,400,000)</u>	<u>(1,400,000)</u>
Total Assets	\$ 6,864,689,000	\$ 5,472,236,000
Solvency Liabilities		
Active and Disabled Members	\$ 3,680,862,000	\$ 4,035,069,000
Retirees and Beneficiaries	3,016,471,000	3,034,906,000
Deferred Vested Members	325,423,000	344,280,000
Pending/Suspended/Exempt Members	<u>506,000</u>	<u>1,523,000</u>
Total Liabilities	\$ 7,023,262,000	\$ 7,415,778,000
Solvency Position	\$ (158,573,000)	\$ (1,943,542,000)
Prior year credit balance	-	-
Present value of special payments	<u>-</u>	<u>701,952,000</u>
Solvency Surplus/(Deficiency)	\$ (158,573,000)	\$ (1,241,590,000)
Solvency ratio ¹	0.98	0.74

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 and 1% higher than that used for the solvency valuation.

July 1, 2021	Effect	
	\$	%
Solvency liabilities	\$7,023,262,000	
Solvency liabilities (discount rate – 1%)	\$8,184,065,000	\$1,160,803,000 16.5%
Solvency liabilities (discount rate + 1%)	\$6,136,185,000	\$ (887,077,000) -12.6%

Incremental Cost on a Solvency Basis

Given that the assets and liabilities of the Plan have been transferred to the UPP effective as of as well as on July 1, 2021, the incremental cost on a solvency basis has not been prepared for this actuarial valuation.

Section 5: Hypothetical Wind Up Valuation Results

Hypothetical Wind Up Financial Position of the Plan

A hypothetical wind up valuation is performed to determine the financial position of the Plan 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 Plan 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. All assumptions for the hypothetical wind up valuation are listed in Appendix E.

On the basis of Plan 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 July 1, 2021 is shown in the following table. The hypothetical wind up financial position of the Plan as at July 1, 2020 is shown for comparison purposes.

Hypothetical Wind Up Financial Position

	July 1, 2021	July 1, 2020
Assets		
Hypothetical wind up assets	\$ 6,866,089,000	\$ 5,473,636,000
Estimated wind up expenses	<u>(1,400,000)</u>	<u>(1,400,000)</u>
Total Assets	\$ 6,864,689,000	\$ 5,472,236,000
Hypothetical Wind Up Liabilities		
Active and Disabled Members	\$ 5,308,504,000	\$ 5,364,623,000
Retirees and Beneficiaries	3,874,671,000	3,806,667,000
Deferred Vested Members	582,781,000	586,756,000
Pending/Suspended/Exempt Members	<u>506,000</u>	<u>1,523,000</u>
Total Liabilities	\$ 9,766,462,000	\$ 9,759,569,000
Hypothetical Wind Up Surplus/(Deficiency)	\$ (2,901,773,000)	\$ (4,287,333,000)

Transfer Ratio

The transfer ratio is determined as follows:

		July 1, 2021	July 1, 2020
(1) Hypothetical wind up assets		\$ 6,866,089,000	\$ 5,473,636,000
Prior year credit balance	(A)	\$ -	\$ -
Total company normal cost and required special payments until next mandated valuation	(B)	\$ -	\$ 204,697,000
(2) Asset adjustment	Lesser of (A) and (B)	\$ -	\$ -
(3) Hypothetical wind up liabilities		\$ 9,766,462,000	\$ 9,759,569,000
Transfer Ratio [(1)-(2)] / (3)		0.70	0.56

Section 6: Contribution Requirements

There are no further contributions required as of July 1, 2021 as a result of the cessation of accruals under the Plan, the transfer of assets and liabilities from the Plan to the UPP, and the cancellation of special payments pursuant to s.17 of Ontario Regulation 311/15.

Section 7: Actuarial Certificate

Actuarial Opinion, Advice and Certification for the University of Toronto Pension Plan

Regulatory Registration Number: 0312827

This actuarial certification forms an integral part of the actuarial valuation report for the Plan as at July 1, 2021. We confirm that we have prepared an actuarial valuation of the Plan as at July 1, 2021 for the purposes outlined in the Introduction section to this report and consequently:

We hereby certify that, in our opinion:

- Pursuant to the Transfer Agreement and s.15 of Ontario Regulation 311/15, the amount of assets to be transferred from the Plan to the UPP as of July 1, 2021 is \$6,866,089,000, after which no assets will remain in the Plan.
- The UPP Transfer Liabilities as of July 1, 2021, as determined under the actuarial assumptions and methods in Schedule 1 of the Transfer Agreement are \$6,073,545,000
- There are no contribution requirements to the Plan with effect from July 1, 2021.
- The pre-1990 maximum pension restrictions in Subsection 8504(6) of the Regulations to the *Income Tax Act* do not apply to any members of the Plan.
- For the purposes of the valuation:
 - The data on which this valuation is based are sufficient and reliable;
 - The assumptions used are appropriate; and
 - The actuarial cost methods and the asset valuation methods used are appropriate.
- This report and its associated work have been prepared, and our opinion given, in accordance with accepted actuarial practice in Canada and in compliance with the requirements outlined in subparagraphs 147.2(2)(a)(iii) and (iv) of the *Income Tax Act*.
- Notwithstanding the above certifications, emerging experience differing from the assumptions will result in gains or losses in respect of transferred assets and liabilities that will be revealed in subsequent valuations of the UPP.



Andrew Hamilton, FCIA, FSA
Partner



Allan H. Shapira, FCIA, FSA
Senior Partner

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Appendix A: Assets

Asset Data

The Plan's assets are held by State Street Trust Company and invested by University of Toronto Asset Management. The asset information presented in this report is based on the financial statements of the pension fund prepared by Ernst & Young.

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 payments.

Market Value of Assets

The following is a summary of the composition of the Plan's assets by asset type as reported on the audited financial statement as at July 1, 2021. For comparison purposes, the composition at the previous valuation date of June 30, 2020 is also shown.

	<u>July 1, 2021</u>	<u>July 1, 2020</u>
	%	%
Global equities	21.3%	21.8%
Canadian equities	1.6%	1.6%
U.S. equities	22.3%	21.8%
International equities	10.1%	10.6%
Emerging market equities	5.0%	4.7%
Fixed-income	39.2%	38.6%
Other	<u>0.5%</u>	<u>0.9%</u>
Total Invested Assets	100.0%	100.0%

Target Asset Mix

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

Investment Program	Target
Public Equity	45.0%
Private Equity	10.0%
Absolute Return Strategies	12.5%
Alternative Credit	10.0%
Canadian Investment Grade Corporate Bonds	10.0%
Canadian Investment Grade Government Bonds	20.0%
Private Real Estate	5.0%
Cash and Cash Equivalents	<u>(12.5)%</u>
	100.0%

Reconciliation of Changes in Market Value of Assets

The table below reconciles changes in the market value of assets between July 1, 2020 and July 1, 2021.

	July 1, 2020 to June 30, 2021
Market Value of Assets, Beginning of Plan Year	\$ 5,473,636,000
Contributions During Plan Year	
Member	\$ 111,555,000
University Current Service Cost	138,948,000
University Special Payments	<u>99,104,000</u>
Total	\$ 349,607,000
Benefit Payments During Plan Year	
Non-retired members ¹	\$ 41,660,000
Retired members	<u>237,855,000</u>
Total	\$ 279,515,000
Transfers During Plan Year	
Into plan	\$ 6,972,000
Out of plan	<u>-</u>
Total	\$ 6,972,000
Fees/Expenses	
Investment fees/expenses	\$ 57,237,000
Non-investment fees/expenses	<u>3,217,000</u>
Total	\$ 60,454,000
Investment Income	\$ 1,375,843,000
Market Value of Assets, End of Plan Year	\$ 6,866,089,000
Rate of return, net of fees/expenses	23.9%

¹ Includes members who have terminated employment or died

Appendix B: Membership Data

Source of Data

This valuation was based on member data provided by the University as of July 1, 2021. Tests of the sufficiency and reliability of the member data were performed and the results were satisfactory. The tests included:

- A reconciliation of membership status against the membership status at the last valuation. This test was performed to ensure that all members were accounted for. A summary of this reconciliation follows on the next page;
- A reconciliation of birth, hire, and participation dates against the corresponding dates provided for the last valuation to ensure consistency of data;
- A reconciliation of pensionable service against the corresponding amount provided for the last valuation to ensure that no member accrued more than 1 year of pensionable service from July 1, 2020. This test also revealed any members who accrued less than 1 year of pensionable service;
- 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 July 1, 2020 (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.

For active members for whom salary increases as of July 1, 2021 have not been made as a result of collective bargaining not being completed as of the date data was collected, salaries as of July 1, 2021 have been adjusted by the actuarial assumption for salary increases less 1%. A further 1% was applied for Faculty and Librarians to reflect a 1% across-the-board increase made subsequent to the valuation date and retroactive to July 1, 2020.

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

Membership Summary

The table below reconciles the number of members as of July 1, 2021 with the number of members as of July 1, 2020 and the changes due to experience in the period.

	Active and Disabled Members	Retirees and Beneficiaries	Deferred Vested Members	Pending, Suspended, Exempt Members	Total
Members, July 1, 2020	11,010	6,410	3,449	83	20,952
Changes due to:					
New entrants (before July 1)	678	-	16	-	694
New entrants (on July 1)	761	-	-	-	761
Returned from pending	36	-	2	(38)	-
Revised termination	1	-	(1)	-	-
Retirement					
Immediate pension	(265)	338	(73)	-	-
Lump sum	(79)	-	-	-	(79)
Termination					
Pending	-	-	-	-	-
Deferred vested	(238)	-	238	-	-
Lump sum	(127)	-	(139)	(1)	(267)
Death					
No further benefits	-	(149)	-	-	(149)
Surviving beneficiary	(1)	(70)	-	-	(71)
Lump sum	(2)	-	(2)	-	(4)
New beneficiary					
Surviving beneficiary	-	71	-	-	71
Marriage breakdown spouse	-	1	-	-	1
Data correction	<u>5</u>	<u>6</u>	<u>19</u>	<u>-</u>	<u>30</u>
Net change	769	197	60	(39)	987
Members, July 1, 2021	11,779	6,607	3,509	44	21,939

Active and Disabled Members

	July 1, 2021	July 1, 2020
Number ¹	11,779	11,010
Average Age	46.4	47.1
Average Years of Pensionable Service	9.6	10.1
Average Age at Hire	35.5	35.8
Average Salary	\$ 111,242	\$ 108,488
Proportion female	57.6%	57.2%

Retirees and Beneficiaries

	July 1, 2021	July 1, 2020
Number	6,607	6,410
Average Age	76.8	76.7
Average Monthly Benefit	\$ 3,122	\$ 3,084
Proportion female	55.5%	55.1%

Deferred Vested Members

	July 1, 2021	July 1, 2020
Number	3,509	3,449
Average Age	52.8	52.4
Average Monthly Benefit	\$ 584	\$ 569
Proportion female	53.9%	53.7%

¹ Includes members on leaves of absence

Active/Disabled Membership Distribution

The following table provides a detailed summary of the active/disabled membership at the valuation date by years of pensionable 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	15–20	20–25	25–30	>=30	Total
< 30	753	33						786
	\$ 69,858	\$ 73,931	\$	\$	\$	\$	\$	\$ 70,029
30–35	1,010	260	18					1,288
	\$ 89,046	\$ 88,853	\$ 94,153	\$	\$	\$	\$	\$ 89,079
35–40	983	485	192	18				1,678
	\$ 95,083	\$ 104,790	\$ 97,215	\$ 90,354	\$	\$	\$	\$ 98,082
40–45	715	585	363	149	13			1,825
	\$ 97,044	\$ 112,860	\$ 122,584	\$ 109,094	\$ 86,467	\$	\$	\$ 108,102
45–50	446	360	469	256	91	1		1,623
	\$ 96,262	\$ 112,652	\$ 132,043	\$ 137,378	\$ 120,032	\$ *	\$	\$ 118,040
50–55	310	245	292	410	215	32	7	1,511
	\$ 89,367	\$ 108,025	\$ 127,760	\$ 142,241	\$ 147,762	\$ 111,387	\$ 100,523	\$ 122,986
55–60	227	184	237	294	384	100	67	1,493
	\$ 89,384	\$ 105,896	\$ 117,920	\$ 135,358	\$ 143,994	\$ 153,872	\$ 121,532	\$ 124,810
60–65	141	133	154	187	157	210	94	1,075
	\$ 83,143	\$ 105,412	\$ 113,136	\$ 124,044	\$ 149,914	\$ 149,678	\$ 158,157	\$ 126,615
>=65	61	50	65	59	71	47	146	500
	\$ 86,790	\$ 139,982	\$ 127,549	\$ 147,243	\$ 171,065	\$ 197,840	\$ 191,817	\$ 157,625
Total								
Count	4,646	2,335	1,790	1,373	931	390	314	11,779
Average Pensionable Earnings	\$ 88,967	\$ 107,029	\$ 121,650	\$ 133,319	\$ 144,782	\$ 153,215	\$ 164,708	\$ 111,242

Retired/Deferred Vested Membership Distribution

The following table provides a detailed summary of the retired and deferred vested membership at the valuation date by age group. For privacy reasons, average pensions are not shown for groups with two or less members.

Age		Retirees and Spouses Beneficiaries	Deferred Vested Members
< 50	Count	9	1,427
	Average Monthly Lifetime Pension	\$ 2,167	\$ 420
50–55	Count	6	592
	Average Monthly Lifetime Pension	\$ 2,164	\$ 715
55–60	Count	54	640
	Average Monthly Lifetime Pension	\$ 1,779	\$ 748
60–65	Count	414	460
	Average Monthly Lifetime Pension	\$ 2,882	\$ 756
65 ¹ –70	Count	1,134	390
	Average Monthly Lifetime Pension	\$ 2,739	\$ 530
70–75	Count	1,451	
	Average Monthly Lifetime Pension	\$ 3,237	\$
75–80	Count	1,272	
	Average Monthly Lifetime Pension	\$ 3,813	\$
>=80	Count	2,267	
	Average Monthly Lifetime Pension	\$ 2,934	\$
Total			
Count		6,607	3,509
Average Monthly Lifetime Pension		\$ 3,122	\$ 584

¹ Includes all deferred vested members over age 65

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

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

	July 1, 2021	July 1, 2020
Economic Assumptions		
Discount rate	5.60% per year	5.35% per year
Inflation rate	2.00% per year	1.75% per year
Cost-of-living adjustment	1.50% per year	1.3125% per year
Increase in merit and promotion	2.00% per year	Same
Increases in pensionable earnings		
Active members	4.00% per year	3.75% per year
Disabled and leave of absence members	2.75% per year	2.50% per year
Increases in CPP maximum salary	2.75% per year	2.50% per year
Increases in <i>ITA</i> maximum pension limit	\$3,245.56 in 2021; then 2.75% per year	\$3,092.22 in 2020; then 2.50% per year
Interest on member contributions	2.50% per year	1.75% per year
Passive investment expenses	0.05% per year	Same
Non-investment expenses	0.07% per year	Same
Provision for adverse deviations	15.50% of non-indexed liabilities (closed plan)	10.49% of non-indexed liabilities (open plan)

July 1, 2021**July 1, 2020****Demographic Assumptions**

Mortality table	95% of 2014 Canadian Public Sector Pensioners' Mortality Table with mortality improvement scale MI-2017 ¹ from 2014 (sex-distinct rates)	Same
Retirement rates		Same
Academic Staff and Librarians	Variable by age (Table A following), but no earlier than one year after valuation date, subject to early retirement provisions	
Administrative staff, unionized administrative staff, unionized staff and research associates	Age 63, subject to early retirement provisions	
Termination rates	Variable by age (Table B following)	Same
Disability rates	None	Same
Proportion married		
Non-retired proportion with spouse	85% for male members and 70% for female members	Same
Non-retired spousal age differential	Male members with spouse four year 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	40%	Same
Lump sum interest rate	1.97% per year ²	1.67% per year ²
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

¹ No preretirement mortality was applied² Net of cost-of-living adjustment.

Table A—Retirement Rates

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

Age	10 or More Years of Pensionable Service	Less Than 10 Years of Pensionable Service
60	5% ¹	-
61	5%	-
62	5%	-
63	5%	-
64	5%	-
65	30%	30%
66	30%	30%
67	30%	30%
68	30%	30%
69	50%	50%
70	50%	50%
71	100%	100%

¹ Applies at age 60 or, if later, first age at which member is eligible for an unreduced pension

Table B—Termination Rates

Sample rates used in this valuation are shown as rates per 1000 lives in the following table:

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

Justification of Actuarial Assumptions and Methods

Economic Assumptions

Discount Rate

The overall expected return was developed using best-estimate returns for each major asset class in which the pension fund is invested. A Monte Carlo simulation is performed over 30 years where the portfolio returns are projected assuming annual rebalancing. The results are 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 overall expected return has been established based on the University's investment policy and its funding policy (whether formal or informal) and objectives. There may be some barriers to achieving this return such as inflation higher than expected, asset returns lower than expected, and assets and liabilities that are mismatched.

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

Development of Discount Rate

Overall expected return				5.72%
Non-investment expenses				(0.07)%
Investment expenses				
Passive	(1)	(0.05)%		
Actively managed	(2)	<u>0.00 %</u>		
			(1)+(2)	(0.05)%
Additional returns due to active management				<u>0.00%</u>
Discount Rate				5.60%

Increase in Consumer Price Index

The CPI rate assumption reflects our best estimate of future inflation considering current economic and financial market conditions.

Merit and Promotion Increases

The assumption for merit and promotion increases includes the effect of progression through the ranks/grid steps/merit and promotion, reflecting Plan experience and University input.

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.

The assumption for increases in pensionable earnings for disabled members and members on leave of absence reflects the assumed rate of inflation plus the real wage increase assumption.

Increases in CPP Maximum Salary

As the benefits paid to a member from the Plan are dependent on the future CPP Maximum Salary, it is necessary to make an assumption regarding the future increases in the CPP Maximum Salary.

The assumed increase in the CPP Maximum Salary reflects the assumed rate of inflation plus the productivity increase assumption.

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 credited service. The assumed increase in the dollar limit reflects the assumed rate of inflation plus the productivity increase assumption.

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 for these rates.

Expenses

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

Provision for Adverse Deviations

For the purpose of this valuation, the PfAD is established based on the target asset allocation for each category of investments set out in the Plan's Statement of Investment Policies and Procedures in effect at the date of this report.

Asset Mix Component	Investment Categorization under Regulation 76 (12)	Categorization under Regulation 11.2 (8)¹	Target Asset Allocation(%)
Cash and short term	4	Fixed Income ("L")	(12.5)%
Fixed-income	15	Fixed Income ("L")	30.0%
Canadian equities	13	Non-Fixed Income	10.0%
U.S. equities	14	Non-Fixed Income	0.0%
International equities	14	Non-Fixed Income	45.0%
Real estate	7	Alternative Investment ("M")	<u>27.5%</u>
			100.0%
Fixed income ("L")			17.5%
Alternative Investment ("M")			27.5%
(a) Percentage of fixed income for PfAD ["L" + 50%* "M"]			31.25%
(b) Percentage of non-fixed income for PfAD [100%-(a)]			68.75%
(c) Asset mix component (see table below for Closed Plans) ²			10.5%

Percent of Non-Fixed Income Assets	PfAD for Closed Plans	PfAD for Open Plans
0%	0%	0%
20%	2%	1%
40%	4%	2%
50%	5%	3%
60%	7%	4%
70%	11%	6%
80%	15%	8%
100%	23%	12%

¹ The fixed income investments satisfy the minimum credit rating requirements prescribed by the Regulation

² Based on linear interpolation

Benchmark Discount Rate (BDR)

(d) V39056 rate at the valuation date	1.84%
(e) BDR [(d)+1.5%*(a)+5.0%*(b)+0.5%]	6.25%
(f) Best estimate discount rate ¹	5.72%
(g) Plan duration	15.06

PfAD is Determined as Follows:

Fixed component (open 4% or closed 5%)	5.00%
Asset mix component	10.50%
BDR component [Max [0, (g)*((f)-(e))]]	<u>0.00%</u>
Total	15.50%

¹ Gross of non-investment expenses and passive investment management fees.

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 Plan demographics and experience, we have modified the mortality assumptions used on the going concern basis and are now using the following table: 95% of the 2014 Canadian Public Sector Pensioners' Mortality with mortality improvement scale MI-2017 from 2014. The use of this base table is supported by recent experience of the Plan's pensioner and mortality data.

Retirement

For Academic staff/Librarians, retirement rates from age 60 (earliest unreduced retirement age) to age 71 (to reflect the elimination of mandatory retirement) are used. For all other staff groups, a single point retirement age of age 63 is used to reflect the various unreduced early retirement provisions available at age 60 or later (with minimum requirements for pensionable service or age-plus-continuous service points). We monitor actual experience against this assumption at each valuation and consider this retirement age to be appropriate.

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 this Plan. The termination assumption does not have as significant an impact on the valuation as in some other plans because of indexing in the deferral period. The experience gains and losses attributable to this assumption have been relatively small. Therefore, we continue to find this Table appropriate.

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 Plan member becomes disabled, contributory service continues to accrue until unreduced pension commencement age, but employee 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 plan experience. 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 surplus or an unfunded actuarial liability.

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

When calculating the actuarial present value of benefits at the valuation date, the present value of all retirement, withdrawal and preretirement death benefits are included. For each member, the retirement, withdrawal and 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 normal cost will remain relatively level as a percentage of payroll. The projected unit credit actuarial cost method therefore allocates contributions among different periods in an orderly and rational manner for a stable population group.

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

Asset Valuation Method

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

Appendix D: UPP Transfer Assumptions

This appendix summarizes the specified assumptions and methods used to determine the UPP transfer liabilities, which are set forth in Schedule 1 of the Transfer Agreement.

Economic Assumptions

Increase in Consumer Price Index (CPI)	2.00% per year
Cost-of-Living Adjustments	1.50% per year
Increase in Year's Maximum Pensionable Earnings	2.75% per year (CPI + 0.75%)
Increase in <i>Income Tax Act</i> Maximum Pension	2.75% per year (CPI + 0.75%)
Increase in Pensionable Earnings	4.00% per year (CPI + 2.00% ⁽¹⁾) (2.00% per year for members on LTD)
Discount Rate (Expected Investment Return)	5.60% per year (CPI + 3.60%)
Interest Rate on Member Contributions	2.50% per year
Loading for Administrative Expenses	Implicit in expected investment return

Demographic Assumptions

Retirement Rates	See Table A
Termination Rates	See Table B; 50% elect deferred pension and 50% elect commuted values ⁽²⁾
Disability Rates	None assumed
Mortality Rates	95% of CPM 2014 Public Mortality Table with Improvement Scale MI-2017 from 2014 (no adjustment made based on size of pension)
Percentage with Spouse at Pension Commencement Date	Male participants: 85% with spouse at retirement four years younger Female participants: 75% with spouse at retirement two years older

¹ Reflects progression through the ranks, movement through grid steps and merit/promotions.

² Commuted values based on an increase in CPI of 2.00% per year and nominal discount rate of 3.50% per year (i.e., assumed long-term real interest rate of 1.50% per year).

Methods

Actuarial Cost Method

Projected unit credit cost method

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 points

Staff

- 2% from ages 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 points

Table B—Termination Rates (Per 1,000 Members)

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

Appendix E: Solvency and Hypothetical Wind Up Assumptions and Methods

Valuation Assumptions

	July 1, 2021	July 1, 2020
Economic Assumptions		
Discount rate		
Transfer value basis — <i>Without indexation</i>	1.80% per year for 10 years; 3.30% per year thereafter	1.30% per year for 10 years; 2.20% per year thereafter
Annuity purchase basis — <i>Without indexation</i>	3.00% per year;	2.50% per year;
Duration used to determine annuity purchase basis	11.49	11.99
Transfer value basis — <i>With indexation</i>	1.00% per year for 10 years; 1.70% per year thereafter	1.00% per year for 10 years; 1.20% per year thereafter
Annuity purchase basis — <i>With indexation</i>	0.45% per year;	0.25% per year;
<i>Income Tax Act</i> dollar limit	\$3,245.56 per year	\$3,092.22 per year

	July 1, 2021	July 1, 2020
Demographic Assumptions		
Mortality table	2014 Canadian Pensioners' Mortality Table (Combined), with mortality improvement scale CPM-B (sex-distinct rates)	Same
Termination rates	Not applicable	Same
Retirement age		
Active and disabled members		
Ontario members with 55 or more age-plus-service points as of valuation date	June 30 between early retirement date and normal retirement date that produces highest present value with grow-in	Same
Other active members	June 30 between early retirement date and normal retirement date that produces highest present value without grow-in	Same
Deferred vested members	Normal retirement date	Same
Retired members and beneficiaries	Not applicable	Same
Termination of employment	Terminate with full vesting	Same
Marital status		
Non-retired spousal proportion	85% for male members and 70% for female members	Same
Non-retired spousal age differential	Male members with spouse four year younger and female members with spouse two years older	Same
Retired members	Actual marital status and ages are used	Same

	July 1, 2021	July 1, 2020
Other		
Wind up expenses	\$1,400,000	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, Plan provisions and Plan experience, we have made the following assumptions regarding how the Plan's benefits would be settled on Plan wind up:

	Percent of Liability Assumed to be Settled By Purchase of Annuities	Percent of Liability Assumed to be Settled By Lump-Sum Transfer
Active Members		
Not retirement eligible	0%	100%
Retirement eligible	100%	0%
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	Hypothetical wind up valuation includes the value of future escalated adjustments (future indexation) for both the preretirement and postretirement period

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 June 30, 2021 and December 30, 2021 (“CIA Guidance”) released on July 26, 2021.

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 July 1, 2021.

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.

Development of Non-Indexed Discount Rates

The development of the non-indexed discount rates is shown below.

Solvency lump-sum discount rate for 10 years = $V122542^1 + \text{Mid-term bond yield spread adjustment}$
= 1.15% + 0.66%
= **1.81% (rounded to 1.80%) per year**

Solvency lump-sum discount rate thereafter = $V122544 + 0.5 \times (V122544^1 - V122542^1) +$
Long-term bond yield spread adjustment
= 1.85% + 0.5 x (1.85% – 1.15%) + 1.063%
= **3.26% (rounded to 3.30%) per year**

Solvency annuity purchase discount rate = $V39062 + \text{Duration Adjustment}$
= 1.77% + 1.21%
= **2.98% (rounded to 3.00%) per year**

Mortality Table

The derivation of the discount rate above is in conjunction with 2014 Canadian Pensioners’ Mortality Table (Combined) with mortality improvement scale CPM-B, in accordance with the CIA Guidance.

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.

¹ CANSIM Series (annualized)

Assumptions Not Needed

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

- Increases in pensionable earnings;
- Termination of employment rates;
- Disability rates;
- Increases in YMPE; and
- Increases in *Income Tax Act* maximum pension limit.

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 \$1,400,000. We have assumed that the University will still be solvent on the wind up of the Plan.

Calculation of Special Solvency Payments

To calculate the special payments necessary to liquidate the Solvency deficiency we used a weighted average of the solvency discount rates based on the relative proportions of benefit entitlements that are expected to be settled by purchase of annuities and lump-sum transfer.

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 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.

Appendix F: Summary of Plan Provisions

This valuation was based on Plan design information provided by the University as of July 1, 2021. Effective July 1, 2021, the Plan has merged into the UPP and accruals under the Plan have ceased. The following is a summary of the main provisions of the Plan.

Effective Date	January 1, 1966
Eligibility	All members of the University staff in receipt of a rate of annual salary of at least 35% of the CPP Maximum Salary or who are scheduled to work at least 700 hours in the University year, are eligible to become members of the Plan on the July 1, October 1, January 1 or April 1 coincident with or next following attainment of such annual salary, and provided that they have not reached the maximum age prescribed by the <i>ITA</i> and are not an active participant of the Teachers' Pension Plan or any other concurrent pension plan which the University has established or to which it contributes (other than the Canada Pension Plan).
Participation	Participation is required of all eligible members of the staff with the following exceptions: (a) Members of the staff whose percentage of appointment is less than 25% of full-time. (b) Members of the staff whose percentage of appointment is at least 25% of full-time and who have not attained age 35 and completed at least one year of continuous service. (c) Members who can demonstrate to the satisfaction of the University that they have a more advantageous arrangement elsewhere.
Normal Retirement Eligibility	June 30 coincident with or next following attainment of age 65.
Benefit	For Full-Time Service, and Part-Time Service on or after July 1, 1987 Annual benefit equal to (a) + (b) below for each year of Pensionable Service. Academic Staff, Librarians and Research Associates (a) 1.5% of Highest Average Salary up to the Average CPP Maximum Salary. (b) 2.0% of Highest Average Salary in excess of the Average CPP Maximum Salary.

Benefit (continued)

Administrative Staff, Unionized Administrative Staff and Unionized Staff

- (a) 1.6% of Highest Average Salary up to the Average CPP Maximum Salary.
- (b) 2.0% of Highest Average Salary in excess of the Average CPP Maximum Salary.

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.

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 (e.g., buy-back or granting of years of pre-1990 service that was not previously counted as Pensionable Service).

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 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.

¹ Only if retiring on December 31, on June 30

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.

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

Any age up to earlier of termination, normal retirement date or death.

Benefit

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

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:

- (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

A terminating member may choose one of the following options:

- (a) A benefit calculated under the normal retirement formula above 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.

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.

Normal Form of Annuity

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. 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 payable under this Plan and the Prior Plans (including pensions for members who have terminated service on or after July 1, 1982, and pensions for members who have postponed retirement—whether deferred or not, but excluding pensions arising from voluntary additional contributions and from non-reciprocal transfers and excluding those paid from the Teachers Insurance and Annuity Association and the Government Annuities Branch under Prior Plans) will be increased as from 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%.

Member Contributions

Each member contributes each year an amount equal to:

Administrative Staff, Unionized Administrative Staff and Unionized Staff

9.20% of the member's salary up to the CPP Maximum Salary plus 11.50% of the member's salary in excess of the CPP Maximum Salary, up to the pensionable salary cap for contribution purposes (\$181,700 as of July 1, 2021).

Academic Staff, Librarians and Research Associates

9.20% of the member's salary up to the CPP Maximum Salary plus 11.50% of the member's salary in excess of the CPP Maximum Salary, up to the pensionable salary cap for contribution purposes (\$181,700 as of July 1, 2021).

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	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>Act</i> and its Regulations; from July 1, 2012 onward, the increase in CPI plus 2% is removed in conjunction with the increase in required member contribution rates for members noted on the previous page.
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>ITA</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 in the Plan. 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.
Prior Plans	The 1955 Pension Plan for members of the academic and administrative staff, the 1946 Plan for academic staff, the 1919 Plan for academic staff, the 1951 Plan for administrative staff, the 1929 Plan for administrative staff, the 1954 Plan for staff of the Connaught Medical Research Laboratory, and the 1946 Pension Plan of the Ontario College of Pharmacy.
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.

A copy of the administrator certification certifying the accuracy and completeness of the Plan provisions summarized in this report is included in Appendix H of this report.

Appendix G: Glossary of Terms

- The **actuarial value of assets** is the asset value used for going concern valuation purposes. Smoothing methods are sometimes used to smooth investment gains and losses over a certain period.
- The **estimated wind up expenses** is an estimate of the administrative and other expenses expected to be charged against the pension fund if the Plan were to terminate on the valuation date.
- The **going concern excess/(unfunded liability)** is the difference between the actuarial value of assets and sum of the going concern liabilities, the amount equal to the provision for adverse deviations in respect of the going concern liabilities of the pension plan, and the prior year credit balance of the pension plan.
- The **going concern funded ratio** compares the value of the assets of the pension plan determined on the basis of a going concern valuation, including accrued and receivable income but excluding the amount of any letter of credit held in trust for the pension plan, exceeds the prior year credit balance to the total amount of the going concern liabilities of the pension plan.
- The **going concern liabilities** are the actuarial present value of benefits earned in respect of service prior to the valuation date. The going concern liabilities are calculated using the going concern assumptions and methods summarized in Appendix C of this report.
- The **going concern position** is the difference between the actuarial value of assets and the going concern liabilities.
- The **maximum eligible university contribution** refers to an eligible contribution pursuant to Section 147.2(2) of the *Income Tax Act*. Under Subsection 8502(b) of the Regulations to the *Income Tax Act*, each university contribution made after January 1, 1991 in respect of a defined benefit provision of a registered pension plan must be such eligible contribution.

In a university's fiscal year, the following contributions are eligible under Section 147.2(2) of the *Income Tax Act*.

- The university current service cost, eligible under Section 147.2(2) subject to certification by the actuary and approval by the Canada Revenue Agency; plus
- Special payments eligible under Section 147.2(2) up to the amount of the unfunded liability, the solvency deficiency, or the hypothetical wind up deficiency, whichever is greater, subject to certification by the actuary and approval by the Canada Revenue Agency; less
- Required application of excess surplus.

The university current service cost and special payments for this Plan will be deductible under Section 147.2(2) of the *Income Tax Act*, subject to the approval of the Canada Revenue Agency.

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

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

In order to be an eligible contribution in a given fiscal year, university contributions must be made not later than 120 days after the end of the fiscal year.

- The **minimum required university contribution** for each plan year is equal to:
 - The university current service cost; plus
 - Special payments toward amortizing any unfunded liability over ten (10) years beginning one year from the date on which the unfunded liability was established; plus
 - Special payments toward amortizing any solvency deficiency over five years beginning no later than 12 months from the date on which the solvency deficiency was established; less
 - Required application of excess surplus; less
 - Permitted application of surplus; less
 - Permitted application of PYCB.

In order to satisfy the requirements of the *Act* and its Regulations, contributions to the fund must be made in accordance with the following rules:

- Required member contributions (if any) must be remitted to the pension fund within 30 days following the month in which the contributions were received from the member or deducted from his or her remuneration.
 - University current service cost contributions must be remitted to the pension fund within 30 days after the end of the month for which the contributions are payable.
 - Special payments must be remitted to the pension fund in the month for which they are payable.
- The **prior year credit balance** is
 - The PYCB stated in the last report in respect of the Plan under the Regulation; plus
 - The total amount of contributions made to the Plan by the university after the valuation date of the last report in respect of the Plan and before the valuation date for the report being prepared; less
 - The total minimum amount of contributions required to have been made after the valuation date of the last report in respect of the Plan and before the valuation date for the report being prepared, if the contributions had been calculated without reference to any PYCB.

The university may choose to set the PYCB between nil and the amount as calculated above, but may not recapture the amount forfeited at any time.

- **Reduced solvency deficiency** the difference between the sum of 85% of the solvency liability, 85% of solvency liability adjustment and the PYCB to the sum of the solvency asset and solvency asset adjustment.
- **Solvency/Hypothetical wind up assets** are the market value of pension fund assets adjusted to reflect contributions, benefit payments, transfers and fees/expenses in-transit at the valuation date.
- The **solvency asset adjustment** is an adjustment that may be made to the solvency assets to reflect:

- The impact of using an averaging method that stabilizes short-term fluctuations in the market value of the Plan's assets calculated over a period of not more than five years; plus
 - The present value of any remaining special payments required to liquidate any unfunded liability (for service not previously recognized for benefit determination purposes) established after December 31, 1987; plus
 - The present value of any remaining special payments other than those above that are scheduled for payment within six years after the valuation date.
- The **solvency liabilities** are the actuarial present value of benefits earned in respect of service prior to the valuation date determined as if the Plan were wound up on the valuation date and taking into account Section 74 of the *Act* (i.e., grow-in). In calculating the solvency liabilities, which includes plant closure benefits or permanent layoff benefits that would be immediately payable if the Plan sponsor's business was discontinued on the valuation date, the *Act* and its Regulations permit the exclusion of the following benefits:
 - Any escalated adjustments;
 - "Excluded plant closure benefits" that the University elected on November 26, 1992 to exclude;
 - "Excluded permanent layoff benefits" that the University elected on November 26, 1992 to exclude;
 - Special allowances other than those where the member has met all age and service eligibility requirements;
 - Consent benefits other than those where the member has met all eligibility requirements except the consent of the employer, or in the case of a jointly sponsored pension plan, the consent of the employer or the administrator;
 - Prospective benefit increases;
 - Potential early retirement window benefit values; and
 - Pension and ancillary benefits payable under a qualifying annuity contract.

The solvency liabilities are determined using benefit entitlements on the assumption that the Plan has neither a surplus nor a deficit. The solvency liabilities are calculated using the solvency valuation assumptions summarized in Appendix D of this report.

- The **solvency liability adjustment** is an adjustment that may be made to the solvency liabilities to reflect the impact of using a solvency valuation discount rate for discounting the liability that is the average of market discount rates calculated over the same period of time as that used in the calculation of the solvency asset adjustment.
- The **solvency position** is the difference between the solvency assets (net of estimated wind up expenses) and the solvency liabilities.
- The **solvency ratio** compares the solvency assets (plus any letters of credit held in trust exceeding the prior year credit balance) to the solvency liabilities for purposes of Subsections 14(2) and (3) of the Regulations of the *Act* to determine the latest effective date of the next required valuation.
- The **solvency excess/(deficiency)** is the solvency position, increased by the solvency asset adjustment and the solvency liability adjustment, then decreased by the PYCB.
- The **special payments** are payments required to liquidate the unfunded liability and/or reduced solvency deficiency:

- The going concern special payments are payments required to liquidate the unfunded liability, with interest at the going concern valuation discount rate, by equal monthly instalments over a period of ten (10) years beginning one year from the valuation date of the report in which the going concern unfunded liability was determined.
- The solvency special payments are payments required to liquidate the reduced solvency deficiency, with interest at the solvency valuation discount rate, by equal monthly instalments over a period of five years beginning no later than 12 months from the valuation date of the report in which the solvency deficiency was determined.
- The **total normal cost** is the actuarial present value of benefits expected to be earned in respect of service for each year starting on the valuation date. Required member contributions (if any) are deducted from the total normal cost to determine the company normal cost. The total normal cost is calculated using the going concern valuation assumptions and methods summarized in Appendix C of this report.
- The **transfer ratio** compares the solvency assets, minus the lesser of the PYCB and the required company contributions until the next required valuation (before application of the PYCB), to the solvency liabilities plus the liability of any excluded benefits (except for pension benefits and ancillary benefits payable under a qualifying annuity contract). If the transfer ratio is less than 1.00, lump-sum transfers from the pension fund under Section 42 of the *Act* are limited to the commuted value of the member's pension multiplied by the transfer ratio. The administrator may transfer the entire commuted value if:
 - The administrator is satisfied that an amount equal to the transfer deficiency has been remitted to the pension fund; or
 - The aggregate of transfer deficiencies for all transfers made since the last valuation date does not exceed 5% of the Plan's assets at that time.

In June 2009, Subsection 19 of the Regulations of the *Act* was amended and Policy T800-402 was released. The Policy imposes additional restrictions for payment of commuted values under certain circumstances.

Appendix H: Administrator Certification

With respect to the University of Toronto Pension Plan, forming part of the actuarial report as at July 1, 2021, I hereby certify that, to the best of my knowledge and belief:

- The asset data provided or made available to the actuaries is complete and accurate;
- The membership data and subsequent query answers provided or made available to the actuaries are complete and accurate for all persons who are entitled to benefits under the terms of the Plan in respect of service up to the date of the valuation;
- The Plan provisions provided or made available to the actuaries are complete and accurate up to and including amendments effective July 1, 2021;
- The actuaries have been notified of all relevant events subsequent to the valuation measurement date; and
- The terms of engagement contained in Section 1 of this report are accurate and reflect the plan administrator's direction.

Ian MacEachern

Name (print) of Authorized Signatory

Director, Pension, Benefits & Payroll

Title

Signature

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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