# University Pension Plan Ontario

# Report on the Actuarial Valuation as at January 1, 2024

Registration Number 1357243

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September 2024

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# Report on the Actuarial Valuation of the University Pension Plan Ontario as at January 1, 2024

**(Registration Number 1357243)**

## Section 1. Executive Summary

We are pleased to present this report which was prepared at the request of the Board of Trustees (the "Board") of the University Pension Plan Ontario ("the UPP" or "the Plan") for the following purposes:

1. To report on the financial position of the UPP as at January 1, 2024;
2. To satisfy the Funding Policy adopted by the Joint Sponsors of the UPP;
3. To establish the minimum and maximum contributions required for the period from January 1, 2024 until the next filed valuation, for which the effective date must be no later than January 1, 2027;
4. To provide the actuarial certifications required under the Pension Benefits Act (Ontario) (the "PBA") and the federal Income Tax Act (the "ITA").

The UPP is a Jointly Sponsored Pension Plan (JSPP) as defined in Subsection 1(2) of the PBA and is listed under subsection 1.3.1(3) of Regulation 909 of the PBA.

The intended users of this report are the Board (legal administrator of the Plan), the Joint Sponsors of the UPP, the Financial Services Regulatory Authority of Ontario and Canada Revenue Agency. This report is not intended or necessarily suitable for purposes other than those listed above. Any party reviewing this report for other purposes should have their own actuary or other qualified professional assist in their review to ensure that they understand the assumptions, results and uncertainties inherent in our estimates.

### Terms of Engagement

For the purposes of this actuarial valuation report, the significant terms of engagement with the Board are:

- Funding of the Plan is dictated by the Funding Policy, applicable legislation and accepted actuarial practice in Canada;
- The Funding Policy, adopted by the Joint Sponsors of the UPP, specifies the following:
    - the going concern assumptions and methods are set by the Board of Trustees based on the recommendations from the Plan actuary;
    - funding for benefits transferred into the UPP ("pre-conversion date benefits") is the responsibility of the respective participating employer for a period of time; and
    - funding for service earned after the date the participating employer joins the UPP ("post-conversion date benefits") is shared 50/50 between the participating employers and the members.

- For the going concern valuation, we have used an actuarial (smoothed) value of assets. For the hypothetical wind-up and solvency valuations, we have used the market value of assets.
- A margin for adverse deviations has been included in the discount rate, as directed by the Board.
- As permitted by Regulation 909 of the PBA, the solvency valuation reports the value of benefits, excluding the value of prospective benefit increases to be granted after the valuation date.

## Changes Since the Previous Valuation

The last valuation of the UPP was prepared as at January 1, 2023. Since the last valuation, the following changes have occurred:

- With the exception of the indexation rate for pre-conversion benefits accrued under the provisions of the University of Guelph pension plans, we have used the same economic and demographic assumptions as those used at the prior valuation, as at January 1, 2023. The indexation assumption for Guelph pre-conversion benefits was changed from a flat 0.6% to 25% of the inflation assumption. See Appendix B for details of the assumptions used in this valuation and the rationale employed in setting these assumptions. See Section 3 for the impact of the changes in assumptions on the valuation results.
- The hypothetical wind-up and solvency economic assumptions were changed to reflect market conditions as at the valuation date in accordance with the Canadian Institute of Actuaries' (CIA's) Standards of Practice and the CIA's Educational Note on Assumptions for Hypothetical Wind-up and Solvency Valuations. These assumptions are summarized in Appendix C.

## Reliance

We have relied on the following information:

- The UPP qualifies as a JSPP within the meaning of the PBA and is listed under subsection 1.3.1(3) of Regulation 909 under the Act;
- Member data provided by UPP as at November 1, 2023, appropriately extrapolated to December 31, 2023 and reflecting member movement and payouts to December 31, 2023;
- Asset data provided by UPP including the audited financial statements;
- A copy of the University Pension Plan Ontario plan text, effective January 1, 2020, consolidated with amendments to January 1, 2022, approved by the Joint Sponsors on November 1, 2021 and filed for registration with the regulatory authorities;
- A copy of the Statement of the Investment Policies and Procedures of the UPP, effective January 1, 2024; 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.

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## Summary of Results

| ($000's) | January 1, 2024 | January 1, 2023 |
|---|---|---|
| **Going Concern Financial Position** | | |
| Going concern assets | $ 12,215,769 | $ 11,791,498 |
| Going concern liabilities | $ 11,966,492 | $ 11,411,856 |
| Going concern excess/ (unfunded liability) | $ 249,277 | $ 379,642 |
| Going concern funded ratio | 102.1% | 103.3% |
| **Hypothetical Wind-up Financial Position** | | |
| Market value of assets net of provision for wind-up expenses | $ 11,709,434 | $ 10,752,959 |
| Hypothetical wind-up liabilities | $ 13,969,675 | $ 13,151,816 |
| Hypothetical wind-up excess/ (deficiency) | $ (2,260,241) | $ (2,398,857) |
| Transfer ratio | 83.9% | 81.8% |
| **Solvency Financial Position** | | |
| Adjusted solvency assets net of provision for wind-up expenses | $ 11,709,434 | $ 10,752,959 |
| Solvency liabilities after adjustment | $ 11,655,420 | $ 10,569,214 |
| Solvency excess/(deficiency) | $ 54,014 | $ 183,745 |
| Solvency ratio | 100.5% | 101.8% |

| ($000's) | 2024 | 2023 |
|---|---|---|
| **Contribution Sufficiency** | | |
| Total estimated contributions | $ 464,390 | $ 422,411 |
| As a % of capped[1] pensionable earnings | 20.27% | 20.22% |
| Total capped pensionable earnings | $2,291,019 | $2,089,077 |
| | | |
| Total current service cost | $ 460,724 | $ 420,322 |
| Minimum special payments | 0 | 0 |
| Total minimum required contributions | $ 460,724 | $ 420,322 |
| As a % of capped pensionable earnings | 20.11% | 20.12% |
| | | |
| Estimated contribution excess/(shortfall) | $ 3,666 | $ 2,089 |
| As a % of capped pensionable earnings | 0.16% | 0.10% |

[1] Maximum Pensionable Earnings for Contributions set to $201,900 in 2024 and $196,200 in 2023

The Joint Sponsors of the UPP have directed UPP to file this actuarial valuation report with the Financial Services Regulatory Authority of Ontario and with Canada Revenue Agency.

The next actuarial valuation of the Plan should be filed with an effective date no later than January 1, 2027.

This report has been prepared and our opinions given in accordance with accepted actuarial practice in Canada.

Respectfully submitted,

| | |
|---|---|
| Jill Wagman, FCIA, FSA | Jasenka Brcic, FCIA, FSA |
| September 26, 2024 | September 26, 2024 |
| Date | Date |

# Section 2. Introduction

The University Pension Plan Ontario was established effective January 1, 2020. Effective July 1, 2021, the three founding universities, University of Toronto, Queen's University, and University of Guelph, transferred the liabilities and assets of their pension plans into the UPP and their employees began to accrue service in the UPP.

On January 1, 2022, the liabilities and assets of the Contributory Pension Plan for TUFA Employees of Trent University were transferred into the UPP. The members of this plan, as well as employees of UPP and employees of two other Participating Employers affiliated with the participating universities, began to accrue service in the UPP.

Our report is based on the provisions of the Plan text effective January 1, 2020 and restated as of January 1, 2022.

## Subsequent Events

We are not aware of any events that occurred between the valuation date and the date this report was completed that would have a material impact on the results of this valuation.

## Valuations Included in this Report

In this report, we describe the results of three different valuations of the Plan:

- A "going concern valuation" which is used to estimate the funded position of the Plan, assuming the Plan is continued indefinitely for existing members, and to estimate the contributions currently required to be made to the Plan's fund, both to fund the cost of any benefits being earned by members for post-conversion date benefits, and, in the event there is a funding deficiency, to liquidate the amount of the funding deficiency.
- A "Funding Policy" valuation. In accordance with the Funding Policy adopted by the Joint Sponsors of the UPP, going concern deficits for pre-conversion date benefits are the responsibility of the respective participating employer for a period of time, whereas going concern deficits for post-conversion date benefits are the joint responsibility of the members and the participating employers, shared on a 50/50 basis. Therefore, going concern assets and liabilities in respect of pre-conversion date and post-conversion date benefits are tracked separately by UPP through a notional allocation structure. See Section 4 for more details.
- A "hypothetical wind-up valuation", which is intended to reflect the status of the Plan as if it had been wound up on the valuation date and the Plan members had been provided with the benefits specified by the Plan and the PBA. The hypothetical wind-up valuation is not used to determine the required contributions to the Plan.
- A "solvency valuation", which is required by the Regulations under the PBA. This valuation is similar to a hypothetical wind-up valuation, except that certain adjustments may be made to the assets and liabilities. For JSPPs, the solvency valuation does not affect the required contributions to the Plan. If the solvency valuation reveals that there is a "solvency deficiency" (as defined in the Regulations), a solvency deficiency can be specified to be a stated amount which is less than the solvency deficiency but not less than zero as permitted under Section 1.3.1(3) of the Regulations of the PBA.

The difference between the hypothetical wind-up and solvency valuation for this Plan relates to the value of "escalated adjustments" (i.e., future indexing to be granted after the valuation date) which are included in the hypothetical wind-up liabilities. In the solvency valuation, these escalated adjustments are excluded as permitted by the Regulations under the PBA.

## Filing Requirements

This report outlines the movements of the Plan's financial position since the previous filed valuation as at January 1, 2023, and, as directed by the Joint Sponsors, will be filed with the Financial Services Regulatory Authority of Ontario and Canada Revenue Agency to meet the filing requirements of the PBA and in order to ensure that contributions recommended in the report will qualify as eligible contributions for purposes of the ITA.

The report covers the period from January 1, 2024 to December 31, 2026 and is to be used by the Board to determine its funding requirements during that period or until the next actuarial valuation is filed, if sooner. The next actuarial valuation to be filed must have an effective date no later than January 1, 2027.

Assessments are not payable to the Pension Benefits Guarantee Fund in accordance with Subsection 37 of the Regulations under the PBA, as the UPP is a JSPP.

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# Section 3. Going Concern Valuation

## Valuation Balance Sheet

The following is the going concern valuation balance sheet as at January 1, 2024 based on:

- the Plan provisions (summarized in Appendix A);
- the going concern valuation assumptions (described in Appendix B);
- the membership data (summarized in Appendix D); and
- the actuarial (smoothed) value of assets (summarized in Appendix F),

with comparative figures from the valuation as at January 1, 2023.

| January 1, 2024 ($000's) | Pre-Conversion Date Benefits | Post-Conversion Date Benefits | Total |
|---|---|---|---|
| **Going Concern Assets** | | | |
| Market value[1] | $ 10,620,357 | $ 1,099,077 | $ 11,719,434 |
| Smoothing adjustment | 445,778 | 50,557 | 496,335 |
| **Going concern actuarial value of assets** | **$ 11,066,135** | **$ 1,149,634** | **$ 12,215,769** |
| **Going Concern Liabilities** | | | |
| Active members and members on leave and LTD | | | |
| Defined benefit liabilities | $ 3,886,379 | $ 1,055,029 | $ 4,941,408 |
| Money purchase liabilities | 756,870 | - | 756,870 |
| Deferred vested members | | | |
| Defined benefit liabilities | 372,288 | 13,283 | 385,571 |
| Money purchase liabilities | 172,645 | - | 172,645 |
| Retired members and survivors | 5,671,291 | 37,780 | 5,709,071 |
| Other members | 905 | 22 | 927 |
| **Total going concern liabilities** | **$ 10,860,378** | **$ 1,106,114** | **$ 11,966,492** |
| **Total Going Concern Excess/ (Unfunded Liability)** | $ 205,757 | $ 43,520 | $ 249,277 |
| **Going Concern Funded Ratio** | | | 102.1% |

[1]As provided by UPP

The going concern funded ratio is the ratio of the going concern actuarial value of assets to the going concern liabilities.

| January 1, 2023 ($000's) | Pre-Conversion Date Benefits | Post-Conversion Date Benefits | Total |
|---|---|---|---|
| **Going Concern Assets** | | | |
| Market value[1] | $ 10,182,654 | $ 580,305 | $ 10,762,959 |
| Smoothing adjustment | 967,607 | 60,932 | 1,028,539 |
| **Going concern actuarial value of assets** | $ 11,150,261 | $ 641,237 | $ 11,791,498 |
| **Going Concern Liabilities** | | | |
| Active members and members on leave and LTD | | | |
| Defined benefit liabilities | $ 3,942,146 | $ 593,501 | $ 4,535,647 |
| Money purchase liabilities | 789,787 | - | 789,787 |
| Deferred vested members | | | |
| Defined benefit liabilities | 356,524 | 4,921 | 361,445 |
| Money purchase liabilities | 177,568 | - | 177,568 |
| Retired members and survivors | 5,524,793 | 13,068 | 5,537,861 |
| Other members | 8,955 | 593 | 9,548 |
| **Total going concern liabilities** | $ 10,799,773 | $ 612,083 | $ 11,411,856 |
| **Total Going Concern Excess/ (Unfunded Liability)** | $ 350,488 | $ 29,154 | $ 379,642 |
| **Going Concern Funded Ratio** | | | 103.3% |

[1]As provided by UPP

## Experience Gain and Loss

| ($000's) | |
|---|---|
| **Going concern excess/(unfunded liability) at January 1, 2023** | **$ 379,642** |
| Interest during inter-valuation period | 20,691 |
| Special Payments | 61,843 |
| **Expected excess/(unfunded liability) at January 1, 2024** | **$ 462,176** |
| **Plus** actuarial (losses)/gains due to experience differing from assumed during the inter-valuation period: | |
| • (Loss)/gain attributable to net investment experience[1] | (154,976) |
| • (Loss)/gain attributable to change in Minimum Guarantee Pension for Queen's pre-conversion date benefits | (6,884) |
| • (Loss)/gain on actual contributions more than the minimum required | 2,259 |
| • (Loss)/gain on salaries increasing at a different rate than expected | (118,596) |
| • (Loss)/gain on ITA maximum pension increasing at a different rate than expected | (5,194) |
| • (Loss)/gain on YMPE increasing at a different rate than expected | 517 |
| • (Loss)/gain on cost of living increases different than expected[2] | 5,543 |
| • (Loss)/gain on change in deferred indexation reserves for Queen's and Trent pre-conversion date benefits | 5,826 |
| • (Loss)/gain on terminations other than expected | 17,154 |
| • (Loss)/gain on retirements other than expected | 12,443 |
| • (Loss)/gain on mortality other than expected | 8,524 |
| Net actuarial experience (loss)/gain | (233,384) |
| (Loss)/gain due to data corrections | (11,449) |
| (Loss)/gain due to change in assumptions | 12,180 |
| Other experience resulted in a net (loss)/gain | 19,754 |
| **Going concern excess/(unfunded liability) at January 1, 2024** | **$ 249,277** |

[1] Net of gain on investments on Queen's pre-conversion money purchase accounts
[2] Reflects indexation of 3.55% granted on January 1, 2024 to post-conversion date benefits, indexation of 2.55% granted on July 1, 2024 to UofT pre-conversion date benefits, indexation of 1.17% that will be granted on October 1, 2024 to Guelph pre-conversion date benefits.

## Current Service Cost

Based on the Plan provisions, assumptions and membership data described herein, we summarize the Plan's estimated contributions and current service cost as at January 1, 2024 in the tables below, with comparative figures from the valuation as at January 1, 2023.

| % of capped pensionable earnings | January 1, 2024 | January 1, 2023 |
|---|---|---|
| **Estimated contributions** | 20.27% | 20.22% |
| **Current service cost** | 20.11% | 20.12% |
| **Special payments for post-conversion date deficit** | 0.00% | 0.00% |
| **Minimum required contributions** | 20.11% | 20.12% |
| **Excess/(deficiency) of contributions** | 0.16% | 0.10% |

| ($000's) | January 1, 2024 | January 1, 2023 |
|---|---|---|
| **Capped pensionable earnings** | **$2,291,019** | **$2,089,077** |
| **Estimated contributions** | $464,390 | $422,411 |
| **Current service cost** | $460,724 | $420,322 |
| **Special payments for post-conversion date deficit** | 0 | 0 |
| **Minimum required contributions** | $460,724 | $420,322 |
| **Excess/(deficiency) of contributions** | $3,666 | $2,089 |

For service on or after January 1, 2025, the contribution and benefit formulae are revised to reflect the enhancements made to the Canada Pension Plan and therefore integrate with the Year's Additional Maximum Pensionable Earnings (YAMPE) in place of the Year's Maximum Pensionable Earnings (YMPE), which is used for service prior to January 1, 2025. The change to YAMPE will also affect the calculation of the Maximum Pensionable Earnings for Contributions. The estimated impact on contributions and current service cost, calculated as at January 1, 2024, is shown below:

| % of capped pensionable earnings | January 1, 2025 | January 1, 2026 |
|---|---|---|
| **Estimated contributions** | 19.99% | 19.99% |
| **Current service cost** | 19.82% | 19.82% |
| **Special payments for post-conversion date deficit** | 0.00% | 0.00% |
| **Minimum required contributions** | 19.82% | 19.82% |
| **Excess/(deficiency) of contributions** | 0.17% | 0.17% |

Estimated dollar amounts for contributions and current service costs on and after 2025 are provided in Section 7. The actual dollar amount of current service costs for the years following the valuation date may be higher or lower than the amounts estimated if the actual pensionable earnings are different than assumed.

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## Sensitivity Analysis

The table below shows the impact on the total going concern actuarial liability and the current service cost as at January 1, 2024 of a one percentage point change in the discount rate assumption. All other assumptions were unchanged.

| ($000's) | Discount rate 1% lower | Discount rate 1% higher |
|---|---|---|
| Change in total going concern actuarial liability | $1,762,337<br>14.7% | ($1,374,829)<br>(11.5%) |
| Change in total current service cost | $124,631<br>27.1% | ($91,183)<br>(19.8%) |

# Section 4. Funding Policy Valuation

## Funding Policy

In accordance with the Funding Policy adopted by the Joint Sponsors of the UPP, pre-conversion date benefits are the responsibility of the respective participating employers for a period of time, whereas going concern deficits for post-conversion date benefits are the joint responsibility of the members and the participating employers, shared on a 50/50 basis.

For post-conversion date benefits:

- The contribution rate required to fund post-conversion date benefits under the UPP will be shared 50/50 between participating employers and members.
- Contributions required to fund deficits in respect of UPP post-conversion date benefits will be shared 50/50 between participating employers and members.
- Funded conditional indexation applies to these benefits – contribution rates are established including post-retirement indexation at 75% of the assumed increase in Consumer Price Index (CPI), with indexation paid at 75% of the increase in CPI unless the Plan Sponsors jointly decide to activate the conditionality lever to pay future indexation below this level.

For pre-conversion date benefits:

- Initial pre-conversion going concern deficits for each participating employer are to be funded by the employer over a period of time in accordance with the transfer agreement between the employer and the Joint Sponsors.
- Transition of responsibility to both members and employers for losses and gains arising after the conversion date on pre-conversion assets and liabilities is determined per the Funding Policy.

The Funding Policy therefore requires the notional tracking of assets and liabilities between post-conversion date benefits and pre-conversion date benefits and by university for pre-conversion date benefits. UPP is responsible for the notional tracking of assets.

## Funding Policy Valuation Results

The valuation as at January 1, 2024, prepared in accordance with the Funding Policy, results in the following pre-conversion going concern unfunded liabilities for Trent University and the University of Guelph which must be amortized over a period no greater than 15 years with the ability to defer the start of the amortization for new payments for one year.

| ($000's) | University of Guelph | Trent University |
|---|---|---|
| Unfunded liability at January 1, 2024 | $1,851 | $18,973 |
| Minimum annual required payment* beginning in 2024 | $179 | $1,878 |
| Minimum annual required payment* beginning in 2025 | $189 | $1,927 |

* payable monthly

Since Trent University had an unfunded liability at the previous valuation, the minimum annual required payments are determined as follows:

| Effective Date | Annual Special Payment ($000's) | End of Liquidation Period | Present Value on January 1, 2024 ($000's) |
|---|---|---|---|
| January 1, 2023 | $985 | December 31, 2037 | $9,732 |
| January 1, 2024 | $893* | December 31, 2038 | $9,241 |
| Total | $1,878 | | $18,973 |

* $942,000, if the first payment is deferred to 2025

No other participating employer is required to make pre-conversion deficit funding payments and there is no post-conversion deficit.

# Section 5. Hypothetical Wind-Up Valuation

The purpose of the hypothetical wind-up valuation is to determine the financial position of the Plan if it were wound up on the valuation date. Accordingly, the following approach was used:

1. The Plan assets were valued at their market value.
2. The benefits valued were the pensions to which members would be entitled under applicable legislation and the Plan if the Plan were wound up on the valuation date.
3. The Joint Sponsors have not made an election to exclude the UPP from the operation of Section 74 of the Act. Therefore, for members whose age and service add to 55 or more, the pension may start at any age at which the member would have qualified for a pension if the Plan had not been wound up and if the member had continued in employment until retirement. Thus, the pension for such a member could start at age 55 or later.

   In the hypothetical wind-up valuation, we assumed that the pension would start at the age which produced the highest present value of the pension for all members who were assumed to elect the annuity purchase option. For all other members who elected the lump sum option, it was assumed with a probability of 50% that the pension would start at the earliest age at which the member will be entitled to an unreduced lifetime pension and with a probability of 50% the pension would start at the age which produced the highest present value of the pension.

   For members whose age and service add to less than 55, the pension was assumed to commence at normal retirement age.
4. The actuarial assumptions are developed in accordance with the CIA's Standard of Practice Section 3500 for determining Pension Commuted Values, and the Explanatory Note: Guidance for Assumptions for Hypothetical Wind-up and Solvency Valuations Update – Effective December 31, 2023, and Applicable to Valuations with Effective Dates on or after December 31, 2023, and No Later Than June 29, 2024. These assumptions are described in detail in Appendix C.
5. The values of the pensions are not discounted for termination or death or disability before the pension start date.
6. Contingent benefits are included in the liabilities under the hypothetical wind-up valuation.

Based on the Plan provisions in effect on January 1, 2024, the wind-up valuation assumptions mentioned above and the membership data supplied by UPP, the following is the wind-up position as at January 1, 2024:

| ($000's) | January 1, 2024 | January 1, 2023 |
|---|---|---|
| **Hypothetical Wind-up Assets** | | |
| Market value | $ 11,719,434 | $ 10,762,959 |
| Allowance for wind-up expenses | (10,000) | (10,000) |
| **Total hypothetical wind-up assets** | **$ 11,709,434** | **$ 10,752,959** |
| | | |
| **Hypothetical Wind-up Liabilities** | | |
| Active members and members on leave and LTD | | |
| Defined benefit liabilities | $ 6,110,743 | $ 5,609,613 |
| Money purchase liabilities | 756,870 | 789,787 |
| Deferred vested members | | |
| Defined benefit liabilities | 534,708 | 507,298 |
| Money purchase liabilities | 172,645 | 177,568 |
| Retired members and survivors | 6,393,782 | 6,057,602 |
| Other members | 927 | 9,948 |
| **Total hypothetical wind-up liabilities** | **$ 13,969,675** | **$ 13,151,816** |
| | | |
| **Hypothetical Wind-up excess/ (deficiency)** | $ (2,260,241) | $ (2,398,857) |
| | | |
| **Transfer ratio** | 83.9% | 81.8% |

The Prior Year Credit Balance is nil.

The transfer ratio is the ratio of the total hypothetical wind-up assets, prior to the allowance for wind-up expenses, to the hypothetical wind-up liabilities.

If the transfer ratio is less than 100%, there are regulatory restrictions on the transfer of commuted values to terminating members.

If the transfer ratio falls by a prescribed amount since the last filed valuation, no commuted values may be paid out of the Plan until approval is obtained from the Financial Services Regulatory Authority of Ontario.

## Hypothetical Wind-Up Valuation Sensitivity Analysis

If the hypothetical wind-up discount rate changed by 1% from the assumptions described in Appendix C, and all other assumptions remained the same, the total hypothetical wind-up liabilities would change as follows:

| ($000's) | Discount rate 1% lower | Discount rate 1% higher |
|---|---|---|
| Change in wind-up liabilities | $1,777,863<br>12.7% | ($1,390,668)<br>(10.0%) |

## Incremental Cost

In accordance with the CIA's Standard of Practice, we have estimated the incremental cost of the hypothetical wind-up liability as at January 1, 2024. This is the expected aggregate change in hypothetical wind-up liability between January 1, 2024 and January 1, 2027. The incremental cost is the present value, at the valuation date, of the expected aggregate change in the hypothetical wind-up or solvency liability between the valuation date and the next required valuation date. It also reflects expected benefit payments between the valuation date and the next required valuation date.

| | 3 years |
|---|---|
| Incremental Cost on a wind-up basis (000's) | $ 1,244,876 |

The incremental cost does not impact the funding requirements of the Plan under the PBA and is for information purposes only.

## Pension Benefits Guarantee Fund

Assessments are not payable to the Pension Benefits Guarantee Fund in accordance with Subsection 37 of the Regulations under the PBA, as the UPP is a JSPP.

# Section 6. Solvency Valuation

The table below shows the solvency position of the Plan as at January 1, 2024. The calculations are based on the Plan provisions in effect on the valuation date, including the solvency valuation assumptions described in Appendix C, and the membership data supplied by UPP.

The solvency valuation is similar to the hypothetical wind-up valuation except for the adjustments to the solvency liabilities, as noted in Section 2. As permitted by the Regulations to the PBA, the solvency liabilities exclude the value of "escalated adjustments" (i.e., future indexing adjustments to be granted after the valuation date). The value of this amount as at the valuation date is $2,314,255.

| ($000's) | January 1, 2024 | January 1, 2023 |
|---|---|---|
| **Solvency Assets** | | |
| Market value | $ 11,719,434 | $ 10,762,959 |
| Allowance for wind-up expenses | (10,000) | (10,000) |
| Total solvency assets | **$ 11,709,434** | **$ 10,752,959** |
| | | |
| **Solvency Liabilities** | | |
| Active members and members on leave and LTD | | |
| Defined benefit liabilities | $ 4,854,920 | $ 4,217,637 |
| Money purchase liabilities | 756,870 | 789,787 |
| Deferred vested members | | |
| Defined benefit liabilities | 345,304 | 293,744 |
| Money purchase liabilities | 172,645 | 177,568 |
| Retired members and survivors | 5,524,754 | 5,081,163 |
| Other members | 927 | 9,315 |
| Total solvency liabilities | **$11,655,420** | **$10,569,214** |
| **Solvency excess/ (deficiency)** | **$ 54,014** | **$ 183,745** |
| **Solvency ratio** | **100.5%** | **101.8%** |

As at January 1, 2024, there is a solvency excess.

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## Solvency Valuation Sensitivity Analysis

If the solvency discount rate changed by 1% from the assumptions described in Appendix C, and all other assumptions remained the same, the total solvency liabilities would change as follows:

| ($000's) | Discount rate 1% lower | Discount rate 1% higher |
|---|---|---|
| Change in solvency liabilities | $ 1,425,071<br>12.2% | ($1,118,071)<br>(9.6%) |

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# Section 7. Contribution Requirements

## Minimum Post-Conversion Funding Requirements

Participating employers and Plan members are required to make annual current service cost contributions, as well as special payments to fund any post-conversion date going concern unfunded actuarial liability as at January 1, 2024. As at January 1, 2024 there is no post-conversion unfunded liability.

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 $201,900 in 2024). Beginning January 1, 2025, members and participating employers each contribute 9.20% of Pensionable Earnings up to the Year's Additional Maximum Pensionable Earnings (YAMPE) plus 11.50% of Pensionable Earnings above the YAMPE up to the Maximum Pensionable Earnings for Contributions. We have assumed the Maximum Pensionable Earnings for Contributions in 2025 and beyond will be adjusted for the change to YAMPE.

If the number of actively employed members remains at the January 1, 2024 level, and if the members' Pensionable Earnings increases at the assumed salary escalation rate thereafter, the minimum required annual estimated contributions under the PBA for the three years following the valuation would be as follows:

| % of capped pensionable earnings | 2024 | 2025 | 2026 |
|---|---|---|---|
| **Estimated contributions** | 20.27% | 19.99% | 19.99% |
| **Current service cost** | 20.11% | 19.82% | 19.82% |
| **Post-conversion date special payments** | 0.00% | 0.00% | 0.00% |
| **Minimum required contributions** | 20.11% | 19.82% | 19.82% |
| **Excess/(deficiency) of contributions** | 0.16% | 0.17% | 0.17% |

| ($000's) | 2024 | 2025 | 2026 |
|---|---|---|---|
| **Capped pensionable earnings** | **$2,291,019** | **$2,386,953**[1] | **$2,482,431**[1] |
| **Estimated contributions** | $464,390 | $477,152 | $496,238 |
| **Current service cost** | 460,724 | 473,094 | 492,018 |
| **Post-conversion date special payments** | 0 | 0 | 0 |
| **Minimum required contributions** | $460,724 | $473,092 | $492,018 |
| **Excess/(deficiency) of contributions** | $ 3,666 | $ 4,058 | $ 4,220 |

[1] Incorporates the estimated Maximum Pensionable Earnings for Contributions in 2025

As summarized in the previous tables, the estimated contributions are expected to be sufficient to meet the minimum funding requirements of the Plan until the date of the next valuation.

The actual dollar amount of contributions for the years following the valuation date may be higher or lower than the amounts indicated above if the actual capped pensionable earnings are different than assumed.

## Minimum Pre-Conversion Funding Requirements

There is a going concern excess as at January 1, 2024, therefore no special payments are statutorily required under subsection 5.1(b) of Regulation 909 under the Act. However, in accordance with the Funding Policy, the following minimum annual special payments are required for pre-conversion date benefits:

| ($000's) | University of Toronto | Queen's University | University of Guelph | Trent University | Total Pre-conversion |
|---|---|---|---|---|---|
| **Minimum annual payments (payable monthly) for pre-conversion date benefits, beginning in 2024** | $0 | $0 | $179 | $1,878 | $2,057 |

## Excess Surplus

Subsection 147.2(2) of the ITA prohibits employer contributions to a registered pension plan if the actuarial surplus exceeds a stated threshold. If an *excess surplus* exists and no employer contributions are required under applicable provincial legislation, employer contributions must be suspended, to the extent permitted under applicable provincial legislation, until the excess surplus is eliminated.

An *excess surplus* is defined by paragraph 147.2(2)(d) of the ITA as the amount by which a Plan's going concern funding excess exceeds 25% of the actuarial liabilities. Based on this formula, the Plan has an excess surplus of $0 as at January 1, 2024 and therefore there is no impact on the contribution requirements for the Plan.

## Maximum Eligible Contributions

The maximum tax-deductible contributions that can be made to the Plan is equal to the sum of:

1. A lump sum equal to the greater of the going concern unfunded liability and the hypothetical wind-up deficiency, plus interest thereon; and
2. The current service contributions of 20.11% of earnings in the year following the valuation date and 19.82% each year thereafter until the date of the next valuation.

Because the Plan has a hypothetical wind-up deficiency of $2,260,241,000 as at January 1, 2024, total member and participating employer contributions to plan are eligible contributions under the ITA.

Paragraph 8503(4)(a) of the Regulations to the ITA 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 Canada Revenue Agency to the UPP pursuant to subsection 8503(5) of the Regulations for the period from January 1, 2022 to December 31, 2025. The UPP will apply for a new waiver prior to December 31, 2025.

Under Ontario pension legislation, the participating employer and member contributions are due within 30 days following the end of each month.

## Section 8. Actuarial Opinion

This opinion is based on the actuarial valuation of the University Pension Plan Ontario as at January 1, 2024.

In our opinion, in respect of the going concern valuation, the hypothetical wind-up valuation and the solvency valuation,

1. the membership data on which the valuations are based are sufficient and reliable for the purposes of the valuations;
2. the assumptions are appropriate for the purposes of the valuations; and
3. the methods employed in the valuations are appropriate for the purposes of the valuations.

This report has been prepared, and our opinions given, in accordance with accepted actuarial practice in Canada.

Notwithstanding the foregoing opinion, emerging experience differing from the assumptions will result in gains or losses which will be revealed in future valuations.

This report has been prepared in a manner consistent with the recommendations for the preparation of actuarial valuation reports issued by the Canadian Institute of Actuaries.

This report has been prepared in accordance with applicable legislation.

| | |
|---|---|
| Jill Wagman | Jasenka Brcic |
| Fellow, Canadian Institute of Actuaries | Fellow, Canadian Institute of Actuaries |

September 2024

# Appendix A: Summary of Plan Provisions

This appendix describes the substantive provisions of the Plan, as amended to January 1, 2024, that have been reflected in the results of the valuation.

## POST-CONVERSION DATE BENEFITS:

### Eligibility

Full-time employees of a participating employer must join the Plan on the first day of the month coincident with or following their date of hire. Other than continuous full-time employees may elect to join the Plan after completing 2 consecutive calendar years of service in which either earnings exceed 35% of the YMPE or hours worked exceed 700.

### Contributions

Members contribute an amount equal to 9.20% of Pensionable Earnings up to the YMPE (YAMPE starting in 2025) plus 11.50% of Pensionable Earnings (up to the Maximum Pensionable Earnings for Contributions) in excess of the YMPE (YAMPE starting in 2025). Participating employers match members' contributions and, under certain types of leaves, make part or all of the member's contributions.

"Maximum Pensionable Earnings for Contributions" means $173,200 in 2020 and increased each year after 2020 by the same percentage increase in the ITA maximum pension limit, subject to adjustments made on the advice of the Plan's actuary. The Maximum Pensionable Earnings for Contributions in 2025 and beyond will be adjusted for the change to YAMPE.

### Retirement Dates

A member's normal retirement date is the last day of the month in which the member attains the age of 65. Early retirement is permitted at any time in the 10-year period preceding the member's normal retirement date. Postponed retirement is permitted until November 30 of the year in which the member attains the age of 71.

### Retirement Benefit

*For each year of Pensionable Service on or after July 1, 2021 and up to December 31, 2024:*
1.60% of Best Average Earnings up to Average YMPE, plus 2.0% of Best of Average Earnings in Excess of the Average YMPE

*For each year of Pensionable Service on or after January 1, 2025:*
1.60% of Best Average Earnings up to Average YAMPE, plus 2.0% of Best of Average Earnings in Excess of the Average YAMPE

"Best Average Earnings" (BAE) means the average of the highest 48 months (does not need to be consecutive) of Pensionable Earnings during participation in the Plan (or prior plans) up to retirement, termination, or death. Best Average Earnings will be capped at the level at which the Income Tax Act maximum pension is reached at the date of determination.

“Average YMPE” means the average of the Year’s Maximum Pensionable Earnings during the last consecutive 48 months of participation in the Plan (or prior plans) up to retirement, termination, or death.

“Average YAMPE” means the average of the Year’s Additional Maximum Pensionable Earnings (YAMPE) during the last consecutive 48 months of participation in the Plan (or prior plans) up to retirement, termination, or death. If the last 48 months of participation includes periods before January 1, 2025, the YAMPE before 2025 will be equal to 114% of the YMPE for that period.

## Early Retirement

The member is entitled to a pension calculated under the normal retirement formula, using BAE, Average YMPE/YAMPE, and Pensionable Service at their early retirement date, reduced by 5% for each year the early retirement date is prior to the normal retirement date.

Members may retire with an unreduced pension benefit if they are at least age 60 and their age plus eligibility service totals at least 80 points.

Active UofT and Guelph members who were within 3 years of early retirement eligibility at July 1, 2021 may have an earlier unreduced early retirement date.

## Postponed Retirement

The member will continue to accrue pension benefits until the earlier of the member’s termination of employment or November 30 in the year in which the member attains the age of 71. The pension is calculated under the normal retirement formula, using BAE, Average YMPE/YAMPE, and Pensionable Service at the postponed retirement date.

## Disability Benefits

A member on long-term disability continues to accrue pension benefits. The member’s Pensionable Earnings will increase at the same rate as increases to the member’s long-term disability benefits. The member’s employer will pay the member required contributions during the period the member is on long-term disability.

## Form of Pension

The normal form for members without a spouse at pension commencement is a lifetime pension guaranteed for 10 years. For members with a spouse at pension commencement, the normal form is a life annuity with 50% continuing thereafter to the surviving spouse for their lifetime. If the member’s spouse is more than 10 years younger than the member, the pension will be actuarially reduced to reflect each additional year in excess of 10 years that the spouse is younger than the member.

## Termination of Employment

A member who terminates employment prior to eligibility for early retirement is entitled to a pension calculated under the normal retirement formula using BAE, Average YMPE/Average YAMPE and Pensionable Service at their termination date, payable at their normal retirement date (or actuarially reduced for early commencement). In lieu of the pension, the member may choose to transfer the commuted value of their accrued pension to a prescribed retirement savings vehicle, a new employer’s pension plan, or a life insurance company to purchase an annuity.

## Pre-retirement Death Benefits

On the death of a member before retirement, the member's beneficiary is entitled to the commuted value of the member's pension calculated under the normal retirement formula using BAE, Average YMPE/Average YAMPE, and Pensionable Service at the member's date of death. If the member was eligible to retire, the commuted value shall include the value of the early retirement provisions of the Plan.

## Funded Conditional Indexation

The Plan provides funded conditional indexation on January 1 each year to post-conversion pensions in pay (prorated if the member was not retired for the full prior year) equal to 75% of the increase in CPI to the previous September 30. The Joint Sponsors may, in accordance with the Funding Policy, provide indexation at a rate less than 75% of the increase in CPI. Notwithstanding the previous sentence, the Joint Sponsors have agreed, for post-conversion service pensions in pay, to grant indexation up to and including January 1, 2028 at 75% of the increase in CPI.

## Maximum Benefits

The annual lifetime pension payable under the Plan, shall not exceed the maximum amount allowed by the ITA for registered pension plans, as in force from time to time.

## Excess Contributions

If the member's contributions with interest at retirement, termination or death exceed 50% of the commuted value of the member's accrued pension, the member is entitled to a refund of the excess contributions. Excess contributions are calculated including contributions and benefits under the prior plans.

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## Pre-Conversion Date Benefits:

The following pages describe the main provisions of the benefits applicable to service prior to the conversion date for members who accrued benefits under the prior plans. Benefits for deferred vested and retired members as of their plan's conversion date are in accordance with the plan texts of the prior plans as of their plan's conversion date.

<table>
<tr><th colspan="3">PRE-CONVERSION: UNIVERSITY OF TORONTO BENEFITS</th></tr>
<tr><td>Conversion Date</td><td colspan="2">July 1, 2021</td></tr>
<tr><td>Normal Retirement Date</td><td colspan="2">Last day of the month in which the member attains the age of 65</td></tr>
<tr><td>Benefit</td><td colspan="2">Academic Staff, Librarians and Research Associates:<br>For each year of Pensionable Service prior to July 1, 2021:<br>1.5% of Highest Average Salary up to the Average CPP Maximum Salary, plus<br>2.0% of Highest Average Salary in excess of the Average CPP Maximum Salary<br><br>Administrative Staff, Unionized Administrative Staff and Unionized Staff:<br>For each year of Pensionable Service before July 1, 2021:<br>1.6% of Highest Average Salary up to the Average CPP Maximum Salary plus<br>2.0% of Highest Average Salary in excess of the Average CPP Maximum Salary<br><br>"Highest Average Salary" means the average of the highest 36 months (does not have to be consecutive) of Salary during participation in the Plan (including after the conversion date) and is limited to a level corresponding to the ITA maximum pension. "Average CPP Maximum Salary" means the average of the YMPE during the last 36 months of participation in the Plan.</td></tr>
<tr><td>Early Retirement Date</td><td colspan="2">Within 10 years of normal retirement</td></tr>
<tr><td>Early Retirement Benefit</td><td colspan="2">The pension calculated under the normal retirement formula, using Highest Average Salary and Average CPP Maximum Salary at the early retirement date, reduced by 5% for each year the early retirement date is prior to normal retirement date</td></tr>
<tr><td rowspan="3">Unreduced Early Retirement Date</td><td>Academic Staff and Librarians:</td><td>December 31 or June 30 following the member's attainment of age 60 with a minimum of 10 years of Pensionable Service</td></tr>
<tr><td>Administrative Staff – P/Ms 6 and Above:</td><td>Age 60 with a minimum 15 of years of Pensionable Service</td></tr>
<tr><td>Administrative Staff (Other than Above), Unionized Administrative Staff, Unionized Staff and Research Associates:</td><td>Age 60 and age plus continuous service totals at least 80</td></tr>
</table>

| PRE-CONVERSION: UNIVERSITY OF TORONTO BENEFITS | |
|---|---|
| Unreduced Early Retirement Benefit | The pension calculated under the normal retirement formula, using Highest Average Salary and Average CPP Maximum Salary at the early retirement date, without reduction for early commencement |
| Postponed Retirement Benefit | The pension calculated under the normal retirement formula, Highest Average Salary and Average CPP Maximum Salary at the postponed retirement date (no later than November 30 of the year in which the member attains age 71). |
| Disability Benefit | The Salary for a member on long-term disability will increase at the same rate as “across the board” increases granted to active employees. |
| Normal Form of Pension | Life guaranteed for 5 years for members without a spouse at pension commencement.<br><br>For members with a spouse at pension commencement, the normal form is a life annuity with 60% continuing thereafter to the surviving spouse for their lifetime. If the member’s spouse is more than 15 years younger than the member, the pension will be actuarially reduced to reflect each additional year in excess of 15 years that the spouse is younger than the member. Under certain circumstances, a survivor’s pension is payable to a member’s dependent children. |
| Termination Benefit | A terminating member is entitled to a pension calculated under the normal retirement formula using Highest Average Salary and Average CPP Maximum Salary at their termination date, payable at normal retirement date (or actuarially reduced for early commencement).<br><br>In lieu of the pension, the member may choose to transfer the commuted value of their accrued pension to a prescribed retirement savings vehicle, a new employer’s pension plan or a life insurance company to purchase an annuity. For terminations after July 1, 2019 but prior to early retirement age, the minimum commuted value is two times the member’s required contributions made prior to July 1, 2019 with interest. |
| Pre-retirement Death Benefit | The commuted value of the member’s accrued pension calculated under the normal retirement formula using Highest Average Salary and Average CPP Maximum Salary at the member’s date of death. If the member was eligible to retire, the commuted value shall include the value of the early retirement provisions of the Plan. |
| Cost of Living Adjustments | Pensions in pay, and deferred pensions for members who terminated service on or after July 1, 1982, will be increased on July 1 each year (prorated if the member was not retired or terminated for the full prior year) by the greater of (a) and (b):<br>(a) The increase in the CPI for the previous calendar year minus 4.0%; or<br>(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%. |
| Maximum Pension | The annual lifetime pension payable under the Plan, shall not exceed the maximum amount allowed by the ITA for registered pension plans, as in force from time to time. |

| PRE-CONVERSION: QUEEN’S UNIVERSITY BENEFITS | | |
|---|---|---|
| Conversion Date | July 1, 2021 | |
| Normal Retirement Date | Last day of the month in which the member reaches age 65 | |
| Benefit | **Money Purchase Pension:** | Pension calculated by converting 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) to a pension using the conversion factors used by the Plan for administration purposes. The Money Purchase Account balance is currently reduced by 4.5% to account for the cost of the non-reduction provision.<br><br>“Fund Interest” is the net rate of return of the Plan assets. |
| | **Minimum Guarantee Pension:** | The amount, if any, of (a) over (b):<br>(a) 1.40% of Final Average Earnings (1.35% for Credited Service before September 1, 1997) up to YMPE Average plus 1.80% of Final Average Earnings in excess of YMPE Average multiplied by Credited Service prior to July 1, 2021<br>(b) the Money Purchase Pension as calculated above<br><br>“Final Average Earnings” means the highest average Earnings over 48 consecutive months.<br>“YMPE Average” means the average of the YMPE during the same 48 months. |
| Early Retirement Date | Any age | |
| Early Retirement Benefit | Pension calculated under the normal retirement formula using Money Purchase Account balance, Final Average Earnings and YMPE Average at the early retirement date, reduced as follows: | |
| | **For Minimum Guarantee Pensions 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 Pensions accrued on or after September 1, 2012:** | If early retirement date is within 10 years of 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;<br>Otherwise: 6% per year from normal retirement date |

| PRE-CONVERSION: QUEEN’S UNIVERSITY BENEFITS | |
|---|---|
| Unreduced Early Retirement Date | Age 60 and age plus continuous service totals at least 80 |
| Unreduced Early Retirement Benefit | Pension calculated under the normal retirement formula using Money Purchase Account balance, Final Average Earnings and YMPE Average at the early retirement date, without reduction for early commencement |
| Postponed Retirement Benefit | Pension calculated under the normal retirement formula using Money Purchase Account balance, Final Average Earnings and YMPE Average at the postponed retirement date (no later than November 30 of the year in which the member attains age 71). |
| Disability Benefit | The Salary for a member on long-term disability will increase at the increase in the Consumer Price Index up to a maximum of 5% per year. |
| Normal Form of Pension | Life guaranteed for 10 years for members without a spouse at pension commencement.<br><br>For members with a spouse at pension commencement, the normal form is a life annuity with 60% continuing thereafter to the surviving spouse for their lifetime. The pension under this form is actuarially equivalent to the pension payable to members without a spouse. |
| Termination Benefit | In lieu of a pension, a Member may elect to transfer their Money Purchase Account plus the excess, if any, of the commuted value of the Minimum Guarantee Pension calculated under the normal retirement formula using Money Purchase Account balance, Final Average Earnings and YMPE Average at the termination date, over the Money Purchase Account, to a prescribed retirement savings vehicle, a new employer’s pension plan, or a life insurance company to purchase an annuity. |
| Pre-retirement Death Benefit | A lump-sum benefit equal to the member’s Money Purchase Account balance plus the excess, if any, of the commuted value of the Minimum Guarantee Pension calculated under the normal retirement formula using Money Purchase Account balance, Final Average Earnings, YMPE Average and Credited Service after January 1, 1987 at the member’s date of death, over the Money Purchase Account balance. |

| PRE-CONVERSION: QUEEN'S UNIVERSITY BENEFITS | | |
|---|---|---|
| Excess Interest Indexation | **For members who retired prior to or on September 1, 2012:** | Pensions in pay for at least one full year are 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 if the 4-year average of the Fund Interest is less than 6%. |
| | **For members retiring after September 1, 2012 (applies only to the Money Purchase Pension and the prorated portion of the Minimum Guarantee Pension in respect of Credited Service prior to September 1, 2012):** | Pensions in pay for at least one full year are 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%. |
| Maximum Pension | The Minimum Guarantee Pension payable at normal retirement, prior to reduction by the Money Purchase Pension, shall not exceed the maximum allowed under the ITA for registered pension plans.<br><br>The maximum pension shall be reduced if the pension commences before normal retirement date. The reduction in respect of service prior to September 1, 2012 is 3% per year that retirement precedes the earliest of age 60, 30 years of service or 80 points (age plus service). The reduction in respect of service on and after September 1, 2012 shall be determined based on the Plan early retirement reductions (3% per year for the first five years prior to normal retirement and 6% per year for each additional year prior to normal retirement). | |

| PRE-CONVERSION: UNIVERSITY OF GUELPH BENEFITS | |
|---|---|
| Conversion Date | July 1, 2021 |
| Normal Retirement Date | Last day of the month in which the member reaches age 65 |
| Benefit | *For each year of Credited Service prior to July 1, 2021:*<br>1.50% (1.60% for USW, OSSTF, CUPE 1334 and Exempt) of Best Average Earnings up to YMPE Average, plus 2.00% of Best Average Earnings in excess of YMPE Average.<br><br>“Best Average Earnings” means the highest average Earnings over 36 consecutive months.<br>“YMPE Average” means the average of the YMPE during the 60 months prior to retirement. |
| Early Retirement Date | Within 10 years of normal retirement |
| Early Retirement Benefit | The pension calculated under the normal retirement formula using Best Average Earnings and YMPE Average at the early retirement date, reduced by 3% for each year that the early retirement date is prior to the earliest of the member’s normal retirement date and the member’s earliest unreduced retirement date if the member had remained in employment. |

| PRE-CONVERSION: UNIVERSITY OF GUELPH BENEFITS | | |
|---|---|---|
| Unreduced Early Retirement Date | **USW, CUPE 1334, CUPE 1334 Unit 1, CUPE 3913 Unit 2, UGFSEA Unit 1, UGFSEA Unit 2, ONA** | Age 55 and 85 points |
| | **UFGA Unit 2** | (1) Age 55 and 85 points for pension benefits earned for Credited Service prior to September 1, 2011; or<br>(2) Age 60 and 90 points for pension benefits earned for Credited Service on or after September 1, 2011 |
| | **Exempt, OPSEU, OSSTF and UNIFOR** | (1) Age 55 and 85 points for pension benefits earned for Credited Service prior to May 1, 2013; or<br>(2) Age 60 and 90 points for pension benefits earned for Credited Service on or after May 1, 2013 |
| | **USW TESL and Non-Represented Members** | (1) Age 55 and 85 points for pension benefits earned for Credited Service prior to July 1, 2013; or<br>(2) Age 60 and 90 points for pension benefits earned for Credited Service on or after July 1, 2013 |
| | **P&M** | (1) Age 55 and 85 points for pension benefits earned for Credited Service prior to July 1, 2013; or<br>(2) Age 60 and 85 points for pension benefits earned for Credited Service on or after July 1, 2013 |
| | **UFGA and Executive** | (1) Age 55 and 85 points for pension benefits earned for Credited Service prior to July 1, 2013; or<br>(2) Age 62 and 87 points for pension benefits earned for Credited Service on or after July 1, 2013 |
| | "points" is the sum of the Member's age and Credited Service | |
| Unreduced Early Retirement Benefit | The pension calculated under the normal retirement formula using Best Average Earnings and YMPE Average at the early retirement date, without reduction for early commencement | |
| Postponed Retirement Benefit | The pension calculated under the normal retirement formula using Best Average Earnings and YMPE Average at the postponed retirement date (no later than November 30 of the year in which the member attains age 71). | |
| Disability Benefit | The Earnings for a member on long-term disability will increase at the same rate as base salary for the member's union, association or group, as applicable. | |

<table>
<tr><th colspan="2">PRE-CONVERSION: UNIVERSITY OF GUELPH BENEFITS</th></tr>
<tr><td>Normal Form of Pension</td><td>Life guaranteed 5 years for members without a spouse at pension commencement.<br><br>For members with a spouse at pension commencement, the normal form is a life annuity with 60% continuing thereafter to the surviving spouse for their lifetime. If the member's spouse is more than 5 years younger than the member, the pension will be actuarially reduced to reflect each additional year in excess of 5 years that the spouse is younger than the member. Under certain circumstances, a survivor's pension is payable to a member's dependent children.</td></tr>
<tr><td>Termination Benefit</td><td>A terminating member is entitled to a benefit calculated under the normal retirement formula based on Best Average Earnings and YMPE Average at the 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.<br><br>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 points had they remained in employment.<br><br>Termination Benefit Change Dates:
<table>
<tr><td>UGFA Unit 2</td><td>September 1, 2011</td></tr>
<tr><td>USW, UGFSEA Unit 2</td><td>January 1, 2012</td></tr>
<tr><td>UGFSEA Unit 1</td><td>May 1, 2012</td></tr>
<tr><td>ONA</td><td>June 1, 2012</td></tr>
<tr><td>UGFA, P&M</td><td>July 1, 2012</td></tr>
<tr><td>OPSEU, UNIFOR, OSSTF, Exempt</td><td>May 1, 2013</td></tr>
<tr><td>USW TESL, Non-Represented, Executive</td><td>July 1, 2013</td></tr>
<tr><td>CUPE 1334, CUPE 1334 Unit 1</td><td>April 30, 2016</td></tr>
<tr><td>CUPE 3913 Unit 2</td><td>September 1, 2016</td></tr>
</table>
For service up to the Termination Benefit Change Date, the minimum lump-sum transfer is two times the member's contributions with interest.<br><br>For pensions in respect of Credited Service after the Termination Benefit Change Date, on early commencement, an actuarial reduction from normal retirement date is applied.<br><br>In lieu of the pension, the member may choose to transfer the commuted value of their accrued pension to a prescribed retirement savings vehicle, a new employer's pension plan or a life insurance company to purchase an annuity.</td></tr>
<tr><td>Pre-Retirement Death Benefit</td><td>The commuted value of the member's accrued pension calculated under the normal retirement formula based on Best Average Earnings and YMPE Average at the member's date of death.</td></tr>
</table>

| PRE-CONVERSION: UNIVERSITY OF GUELPH BENEFITS | |
|---|---|
| Cost of Living Adjustments | Pensions in pay will be increased on September 30 of each year (prorated if the member was not retired for the full prior year) by the excess, if any, of a) over b):<br>(a) Increase in CPI over the twelve-month period ending in April, up to a maximum of 8.00%.<br>(b) 2.00% |
| Maximum Pension | The annual lifetime pension payable under the Plan, shall not exceed the maximum amount allowed by the ITA for registered pension plans, as in force from time to time. |

| PRE-CONVERSION: TRENT UNIVERSITY BENEFITS | |
|---|---|
| Conversion Date | January 1, 2022 |
| Normal Retirement Date | Last day of the month in which the member reaches age 65 |
| Benefit | For each year of Pensionable Service before January 1, 2022:<br>2% of Final Average Earnings<br><br>"Final Average Earnings" means the highest average of Earnings over 5 consecutive years in the last 10 years of service |
| Early Retirement Date | Within 10 years of normal retirement |
| Early Retirement Benefit | The pension calculated under the normal retirement formula using Final Average Earnings at the early retirement date, reduced by 5% for each year the early retirement date is prior to normal retirement date |
| Unreduced Early Retirement Date | Age 60 and age plus eligibility service totals at least 80 |
| Unreduced Early Retirement Benefit | The pension calculated under the normal retirement formula using Final Average Earnings at the early retirement date, without reduction for early commencement |
| Postponed Retirement Benefit | The pension calculated under the normal retirement formula using Final Average Earnings at the postponed retirement date (no later than November 30 of the year in which the member attains age 71) |
| Disability Benefit | The Earnings for a member on long-term disability will increase at the lesser of the rate of increases they would have received had they remained actively employed and the increase applicable to deferred pensions. |
| Normal Form of Pension | Life guaranteed 10 years for members without a spouse at pension commencement.<br><br>For members with a spouse at pension commencement, the normal form is a life annuity with 60% continuing thereafter to the surviving spouse for their lifetime. If the member's spouse is more than 5 years younger than the member, the pension will be reduced by 0.5% for each complete year in excess of 5 that the spouse is younger than the member. |
| Termination Benefit | A terminating member is entitled to a pension calculated under the normal retirement formula using Final Average Earnings at the termination date, payable at normal retirement date (or actuarially reduced for early commencement).<br><br>In lieu of the pension, the member may choose to transfer the commuted value of their accrued pension to a prescribed retirement savings vehicle, a new employer's pension plan or a life insurance company to purchase an annuity. For service prior to July 1, 2010, the minimum commuted value will be two times the member's required contributions made prior to July 1, 2010 with interest. |

| PRE-CONVERSION: TRENT UNIVERSITY BENEFITS | | |
|---|---|---|
| Pre-retirement Death Benefit | *Before Eligibility for Normal Retirement:*<br>The commuted value of the member's accrued pension calculated under the normal retirement formula using Final Average Earnings at the member's date of death.<br><br>*After Eligibility for Normal Retirement:*<br>A survivor pension assuming the member had retired immediately prior to their date of death. The value of this benefit cannot be less that the commuted value above. | |
| Excess Interest Indexation | **For members who retired or terminated prior to July 1, 2006:** | Pensions in pay and pensions in the deferral period are adjusted each July 1 (prorated if the member was not retired or terminated for the full prior year) by the lesser of the increase in CPI over the twelve-month period ending in March and the excess, if any, of the 4-year average of the rate of return of the Plan as of March 31 over 6%. No reduction will be made to pensions even if the 4-year average rate of return is less than 6%. |
| | **For members who retired or terminated on or after July 1, 2006:** | Pensions in pay and pensions in the deferral period are adjusted each July 1 (prorated if the member was not retired or terminated for the full prior year) by the lesser of 50% of increase in CPI (but no greater than 50% of the increase in Average Industrial Wage for pensions in the deferral period) over the twelve-month period ending in March and the amount of indexation that can be provided by Cumulative Excess Investment Earnings (as defined in the Plan text) of the Plan. No reduction will be made to pensions even if Cumulative Excess Investment Earnings are negative. Where Cumulative Excess Investment Earnings are more than sufficient to provide indexation in a year, the excess will be used to provide indexation in respect of previous years. |
| Maximum Pension | The annual lifetime pension payable under the Plan, shall not exceed the maximum amount allowed by the ITA for registered pension plans, as in force from time to time. | |

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# Appendix B:

# Assumptions and Methods – Going Concern

## Summary of Assumptions

| | January 1, 2024 | January 1, 2023 |
|---|---|---|
| **ECONOMIC ASSUMPTIONS** | | |
| Discount rate: | 5.45%, net of investment and administrative expenses | Same |
| Interest on member contributions[1]: | 2.50% per year | Same |
| Inflation rate: | 2.25% for 2024, and 2.0% per year thereafter | 3.50% for 2023, 2.25% for 2024, and 2.0% per year thereafter |
| Indexation Rate (75% of CPI): | 1.6875% for 2025 and 1.5% per year thereafter[2] | 2.625% for 2024, 1.6875% for 2025 and 1.5% per year thereafter[4] |
| Indexation Rate (CPI - 2%): | 1.17% for 2024[3], 0.5625% for 2025 and 0.50% per year thereafter | 4.41% for 2023[5], 1.50% for 2024, 0.25% for 2025 and 0.60% per year thereafter |
| Salary increase: | Active members and members on leave: 4.00% per year<br>Members on LTD: 2.00% per year | Same |
| YMPE increase: | 2.75% per year | Same |
| ITA maximum pension limit increase: | 2.75% per year | Same |
| Investment and administrative expenses: | Discount rate reduced by 0.30% | Same |

[1]Interest on Queen's pre-conversion money purchase balances is assumed to be equal to the discount rate
[2]Indexation at July 1, 2024 for pre-conversion UofT benefits is 2.55% based on CPI to December 31, 2023
[3]Indexation at October 1, 2024 based on CPI to April 30, 2024
[4]Indexation at July 1, 2023 for pre-conversion UofT benefits is 4.74% based on CPI to December 31, 2022
[5]Indexation at October 1, 2023 based on CPI to April 30, 2023

| | January 1, 2024 | January 1, 2023 |
|---|---|---|
| **DEMOGRAPHIC ASSUMPTIONS** | | |
| Mortality: | 95% of 2014 Public Sector Mortality Table, with mortality improvements scale MI-2017 from 2014 (sex distinct) | Same |
| Disability rates: | None | Same |
| Retirement rates: | Active members and members on leave: Table A following<br>Members on LTD: age 65 | Same |
| Termination rates: | Table B following | Same |
| Termination option election: | 40% elect lump sum transfer | Same |
| Lump-sum transfer value discount rate: | Gross rate of 4.0%;<br>Indexation as noted in previous table | Same |
| Marital status: | | |
| Non-retired members: | 85% married for male members;<br>75% married for female members | Same |
| Retired members: | Actual marital status | |
| Spousal age difference: | | Same |
| Non-retired members | Male members have a spouse four years younger and female members have a spouse two years older | |
| Retired members: | Actual ages | |
| **OTHER ASSUMPTIONS** | | |
| Non-reduction reserve: | 7.5% reduction is applied to money purchase accounts;<br>7.5% applied to liabilities for retired members and survivors, which have been determined using true pension rather than actual pension. “True pension” is the pension that would be payable in the absence of the non-reduction provisions of the Plan. | |
| Deferred indexing reserve: | Reflects expected indexation to Trent pensions and Queen’s true pensions based on fund returns to valuation date and expected future returns equal to discount rate | |

| | January 1, 2024 | January 1, 2023 |
|---|---|---|

## Table A – Retirement Rates

| Age | Faculty Rates* | Staff Rates** |
|---|---|---|
| <55 | 0% | 0% |
| 55-59 | 2% | 2% |
| 60-64 | 5% | 7% |
| 65-67 | 30% | 50% |
| 68 | 30% | 100% |
| 69-70 | 50% | N/A |
| 71+ | 100% | N/A |

*additional 5% at first age eligible for an unreduced pension before 65
** additional 15% at first age eligible for an unreduced pension before 65

## Table B – Termination Rates

| Age | Rates | Age | Rates |
|---|---|---|---|
| <25 | 15.0% | 41 | 3.1% |
| 26 | 13.5% | 42 | 3.0% |
| 27 | 12.0% | 43 | 2.8% |
| 28 | 10.7% | 44 | 2.6% |
| 29 | 9.5% | 45 | 2.4% |
| 30 | 8.4% | 46 | 2.2% |
| 31 | 7.5% | 47 | 2.0% |
| 32 | 6.8% | 48 | 1.8% |
| 33 | 6.0% | 49 | 1.6% |
| 34 | 5.4% | 50 | 1.4% |
| 35 | 4.8% | 51 | 1.2% |
| 36 | 4.5% | 52 | 1.0% |
| 37 | 4.2% | 53 | 0.8% |
| 38 | 3.9% | 54 | 0.6% |
| 39 | 3.6% | 55+ | 0.0% |
| 40 | 3.3% | | |

The going concern assumptions and methods are set by the UPP's Board of Trustees based on the recommendations from the Plan actuary within the parameters of the Plan's Funding Policy, legislation and accepted actuarial practice in Canada.

## Actuarial Cost Method

As with the previous valuation, we used the projected unit credit actuarial cost method to determine the going concern actuarial liabilities of the Plan and the current service cost in respect of the defined benefit provisions of the Plan. Under this method, the actuarial liabilities consist of the present value of pensions in payment and vested deferred benefits for terminated members, plus that portion of the future benefits expected to be paid to present members which are related to their credited service up to the valuation date. Amounts of pension are determined based on each member's projected final average earnings. The active member liability arising from the Minimum Guarantee Pension for Queen's pre-conversion date benefits is the actuarial present value of the excess, if any, of the Minimum Guarantee Pension over the Money Purchase Pension at each decrement date. The Money Purchase Pension is calculated by projecting the member's money purchase balance to the assumed decrement age and converting to a pension using the money purchase conversion factors used by the Plan for administration purposes.

If the value of these actuarial liabilities exceeds the actuarial value of the assets (determined as described below), the excess is defined as the unfunded actuarial liability and is funded by fixed special payments over a specified period or periods.

The current service cost for the defined benefit provision for the year following the valuation date is the present value of benefits accrued by Plan members with respect to their service in that year.

The characteristics of this actuarial cost method are that it matches year-by-year costs of benefits expected to be accrued by the Plan members each year to the contributions required for those years and since it results in a pattern of progressively increasing costs for an individual employee as that employee ages, it may also result in progressively increasing costs for the Plan as a whole if the average age profile of the Plan membership increases from year to year.

## Asset Valuation Method

Effective January 1, 2023, we have used an actuarial (smoothed) value of the assets for the going concern assets. Since the Plan has only held assets since July 1, 2021, we have smoothed the assets over the period from July 1, 2021 to January 1, 2024. Ultimately, as the Plan matures, the assets will be smoothed over a five-year period, increasing the smoothing period by one year each January 1 until it reaches a five-year smoothing period as of the January 1, 2025 valuation.

Under the smoothing technique, only a portion of realized and unrealized investment experience over the prior years is recognized at the valuation date. For the January 1, 2023 valuation, 33.33% of the loss in 2022 and 66.67% of the gain in 2021 has been recognized in the smoothed value of assets. For the January 1, 2024 valuation, 25% of the gain in 2023, 50% of the loss in 2022 and 75% of the gain in 2021 has been recognized in the smoothed value of assets. The remaining gains or losses will be recognized in future years. A corridor is applied to the calculation of the smoothed value of assets so that it cannot be less than 85% of the market value nor can it be more than 115% of the market value. The objective of the asset valuation method is to moderate the volatility of contribution rates by deferring the recognition of investment gains and losses over the short-term.

The asset valuation method moderates the short-term effects of fluctuations in the market value, is expected to track to market value over time, and is generally free of bias towards systematic overstatement or understatement in relation to the market value. See Appendix F for the development of the actuarial (smoothed) value of assets as at January 1, 2024.

## Benefits Valued

The benefits valued were those in effect at the valuation date. A summary of the Plan provisions is provided in Appendix A. Funded conditional indexation for post-conversion date benefits equal to 75% of the increase in CPI has been included in the going concern valuation.

## Rationale

### Economic Assumptions

With the exception of the indexation rate for pre-conversion benefits accrued under the provisions of the University of Guelph pension plans, we have used the same economic assumptions as those used at the prior valuation, as at January 1, 2023. Pre-conversion benefits accrued under the University of Guelph pension plans are indexed post-retirement at a rate equal to inflation, to a maximum of 8%, less 2%. Using a stochastic analysis of potential future indexation granted to these benefits, we have determined that an appropriate assumption for this indexation is 25% of inflation. The impact of this change is summarized in Section 3.

For this valuation, we have used the same inflation assumption as the prior valuation. A long-term inflation assumption of 2.0% per year continues to be supported by the same stochastic model used to determine the going concern discount rate, and is consistent with Bank of Canada's long-term target of 1% - 3%. However, beginning in late 2021, inflation in Canada increased substantially above the Bank of Canada's target rate and therefore, to reflect the current higher inflation environment, the inflation assumption was updated at the last valuation to use a select and ultimate approach. The assumed inflation in 2023 and 2024 was based on consensus economic forecasts (3.5% and 2.25%, respectively) and then it is assumed to revert back to the same long-term inflation rate of 2.0% per year.

The selection of the economic assumptions (i.e. those related to interest rates and inflation) for this valuation was based on reasonable expectations for the relationships between key economic variables over the long-term, as well as the expected impact of those economic variables on the investment performance of the pension fund given the UPP's Statement of Investment Policies and Procedures effective January 1, 2024.

The going concern discount rate assumption was developed as follows, with rationale for each component described below:

| | Discount rate |
|---|---|
| Gross investment return | 5.85% |
| Provision for investment and administrative expenses | (0.30%) |
| Estimated net investment return rate before margin | 5.55% |
| Margin for adverse deviations | (0.10%) |
| Going concern discount rate assumption | 5.45% |

The gross rate of investment return and the provision for investment and administrative expenses was provided to us by UPP with supporting data and rationale, and approved by the Board.

The gross rate of return was determined based on the target asset allocation set by the Board as noted in the table below, expected long-term capital market returns, standard deviations and correlations for each major asset class.

| Asset class | Target allocation |
|---|---|
| Cash/Short-term | -10% |
| Long Federal Bonds | 26% |
| Long Provincial Bonds | 8% |
| Real Return Bonds | 8% |
| Private Debt | 6% |
| Public Equity | 28% |
| Private Equity | 6% |
| Real Estate | 8% |
| Infrastructure | 8% |
| Hedge Funds | 12% |
| Total | 100% |

We have verified the reasonableness of UPP's expected gross rate of return using our stochastic model which projects rates of inflation, bond yields and asset class returns for 5,000 paths over a long-term projection horizon.

It was assumed that there will be no added-value returns from the active management strategy employed in excess of the associated additional investment management fees.

Based on the terms of engagement, a margin for adverse deviations has been included in the development of the going concern discount rate assumption, as directed by the Board.

For salary increases, we assumed that the real economic growth in salary would be 2.00% per year above the assumed long-term inflation rate of 2.00% per year, which includes an allowance for merit/promotion increases. This leads to a long-term rate of 4.00% for salary increases. For members on disability the salary increase assumption is 2.00%, excluding the 2.00% real economic growth in salary.

The increase in the Yearly Maximum Pensionable Earnings ("YMPE") was assumed to grow at a real economic rate of 0.75% above the assumed long-term inflation rate of 2.0%, which leads to a long-term assumption of 2.75% for YMPE increases. The Yearly Additional Maximum Pensionable Earnings ("YAMPE") is set to be equal to 114% of the YMPE. The ITA benefit limit after 2024 was also increased at the same rate as the YMPE.

In our view, the economic assumptions we have used for the going concern valuation remain within an acceptable range that would be considered by actuaries to be appropriate for the current circumstances of the Plan.

## Demographic Assumptions

A key demographic assumption which has an impact on this valuation is the mortality of the Plan's members. As in the prior valuation, we have used the 2014 Public Sector Mortality Table ("CPM Public Table") with generational projection using mortality improvement scale MI-2017 starting in 2014. To address the past experience of the prior plans and the membership of the UPP, the mortality rates in the CPM Public table are adjusted by 95%.

For retirement, the rates reflect recent experience of the participating employers. Different rates are used for Faculty and Staff to reflect their different experience.

For termination before retirement, the rates represent a best estimate of termination rates for a plan the size of the UPP and reflect recent experience of the participating employers. For this valuation, the commuted value discount rate used for active terminations in the going concern valuation was increased from 3.5% per year to 4.0% per year to reflect higher expected future bond yields. The impact of this change is summarized in Section 3.

The assumed proportion of members who have a spouse at retirement and the age difference of the spouse has been based on recent experience of the membership.

## Other Assumptions

For the purpose of calculating the Minimum Guarantee Pension, the money purchase accounts for active members entitled to Queen's pre-conversion date benefits have been reduced by 7.5% to account for the future cost of the non-reduction provision. This reduction has been developed using a stochastic analysis to estimate the total cost of the non-reduction provision applicable to Queen's pre-conversion money purchase pensions. The Plan's current administrative practice is to apply a 4.5% non-reduction charge when money purchase accounts are converted to lifetime pensions, so the 7.5% reduction provides an additional 3% provision for non-reduction.

For the purpose of calculating liabilities for retired members and survivors entitled to Queen's pre-conversion date benefits, a 7.5% reserve has been applied to the present value of members' true pensions to account for the estimated cost of the non-reduction provision.

Queen's and Trent pre-conversion pensions in pay are indexed in accordance with an excess investment return formula. A deferred indexing reserve has been calculated for these pensions in pay reflecting actual fund experience prior to the valuation date and an expected rate of return on assets in the future equal to the discount rate.

# Appendix C: Assumptions and Methods – Hypothetical Wind-Up and Solvency

| | January 1, 2024 | January 1, 2023 |
|---|---|---|
| **ECONOMIC ASSUMPTIONS** | | |
| Discount rate per year (Hypothetical Wind-up Basis): | | |
| Without Indexation: | | |
| • Annuity purchase basis | 4.55% per year | 4.91% per year |
| • Transfer value basis | 4.10% per year for 10 years and 4.20% per year thereafter. | 4.30% per year for 10 years and 4.70% per year thereafter. |
| With Indexation at 75% of CPI | | |
| • Annuity purchase basis | 2.19% per year | 1.97% per year |
| • Transfer value basis | 2.80% per year for 10 years and 2.90% per year thereafter. | 2.70% per year for 10 years and 3.10% per year thereafter. |
| With Indexation at CPI -2% | | |
| • Annuity purchase basis | 3.00% per year | 3.23% per year |
| • Transfer value basis | 3.90% per year for 10 years and 4.00% per year thereafter. | 3.80% per year for 10 years and 4.20% per year thereafter. |
| • Duration for annuity purchase rate | 9.90 | 9.60 |
| Interest rate per year (Solvency Basis): | | |
| • Annuity purchase basis | 4.55% per year | 4.91% per year |
| • Transfer value basis | 4.10% per year for 10 years and 4.20% per year thereafter. | 4.30% per year for 10 years and 4.70% per year thereafter. |
| Salary increase: | None | None |
| Final average earnings | The average of the earnings at the valuation date and the corresponding prior years, which were determined by projecting backward using the going concern salary increase assumption. | The average of the earnings at the valuation date and the corresponding prior years, which were determined by projecting backward using the going concern salary increase assumption. |
| YMPE increase: | $68,500 for 2024. No increase in YMPE. | $66,600 for 2023. No increase in YMPE. |
| ITA maximum pension limit increase: | $3,610 per year of pensionable service. | $3,507 per year of pensionable service. |

| | January 1, 2024 | January 1, 2023 |
|---|---|---|
| **DEMOGRAPHIC ASSUMPTIONS** | | |
| Mortality: | 2014 Mortality Table (CPM 2014) with Improvement Scale CPM-B on a unisex basis.<br>90% of mortality rates used for annuity purchase liabilities to reflect expected annuity pricing | Same |
| Disability rates: | None | None |
| Retirement age: | | |
| • Members who were assumed to elect an annuity purchase | Age that produces the highest lump sum value of the pension | Same |
| • All other members who were assumed to elect the lump sum option | 50% probability at age that produces the highest lump sum value assuming all service ceases at the valuation date and 50% probability at earliest age becomes eligible for an unreduced lifetime pension | Same |
| Termination rates: | None | None |
| Marital status: | | |
| Non-retired members | 85% married for male members;<br>75% married for female members | Same |
| Retired members | Actual marital status | |
| Spousal age difference: | | Same |
| Non-retired members | Male members with spouse four years younger and female members with spouse | |
| Retired members | two years older<br>Actual age | |
| Form of Benefit Settlement elected by member: | **Annuity purchase**<br>• 100% of retirees and deferred vested members<br>• 75% of active members who are retirement eligible (other than Queen's members)<br>• Queen's members: 30% of active members who are not retirement eligible and 50% of active members who are retirement eligible | Same |
| | **Transfer Value**<br>All other members | Same |

| | January 1, 2024 | January 1, 2023 |
|---|---|---|
| **OTHER** | | |
| Allowance for Wind-up Expenses: | $10,000,000 | Same |

## Actuarial Cost Method

As with the prior valuation, we valued the termination benefit payable under the Plan or the PBA, if different. Under this valuation, the actuarial liabilities consist of the present value of pensions in payment and vested deferred benefits for terminated members, plus the portion of the future benefits expected to be paid to present members which are related to their credited service up to the valuation date. Amounts of pension for active members are determined based on each member's estimated final average earnings at the valuation date. Actual pensions in pay for Queen's pre-conversion date benefits have been used in the hypothetical wind-up and solvency valuations.

Funded conditional indexation for post-conversion date benefits equal to 75% of the increase in CPI has been included in the hypothetical wind-up valuation.

Queen's and Trent pre-conversion pensions in pay are indexed in accordance with an excess investment return formula. A deferred indexing reserve for the hypothetical wind-up valuation has been calculated for these pensions in pay reflecting actual fund experience prior to the valuation date and an expected rate of return on assets in the future equal to the annuity purchase non-indexed discount rate.

## Asset Valuation Method

As with the previous valuation, we used the market value of assets for the hypothetical wind-up and solvency valuations, adjusting for amounts in transit and amounts payable.

## Incremental Cost

In our report we have determined the incremental cost under the hypothetical wind-up basis. The incremental cost was determined as the sum of (a) and (b) minus (c)

a) the projected hypothetical wind-up liability at the next valuation date for those members at the current valuation date, allowing for expected decrements and change in membership status, service accrual and increase in earnings between the current valuation date and the next valuation date. No adjustment was made for new entrants between the two valuation dates. The resulting projected hypothetical wind-up liability was then discounted to the current valuation date;

b) the present value of the benefit payments expected to be paid between current valuation date and the next valuation date, discounted to the current valuation date;

c) the hypothetical wind-up liability as at the current valuation date.

For purposes of calculating the hypothetical wind-up incremental cost, the expected decrements, as well as the expected benefit payments between the current valuation date and the next valuation date, were determined using the going concern demographic assumptions. The projected hypothetical wind-up liability at the next valuation date was determined using the same method and assumptions as disclosed in Appendix C of this report. In particular, we have assumed that the discount rates will remain the same throughout the projection period and the Standards of Practice for determining commuted value rates in effect at the valuation date will remain unchanged, as will the current educational guidance on the estimation of annuity purchase costs.

# Appendix D: Membership Data

The valuation was based on data as at November 1, 2023, appropriately extrapolated to December 31, 2023 and reflecting member payouts to December 31, 2023. A summary of the data is shown in this Appendix.

We subjected this data to a number of tests of reasonableness and consistency, including the following:

- a member's (and partner's as applicable) age is within a reasonable range;
- all dates remained unchanged from the data used in the previous actuarial valuation of the Plan;
- salaries increased at a reasonable rate;
- credited service increased by a reasonable amount;
- accrued pensions changed by a reasonable amount;
- the form of pension payment did not change (other than resulting from the death of a retired member);
- the pension amounts for retired members and survivors were compared with the payments reported in the financial statements for the Plan; and
- we examined the additions to and deletions from each of the data files (i.e., the files for active employees, retired members and terminated members entitled to a deferred vested pension) since the previous valuation to determine whether all Plan members were accounted for in this valuation, to check for duplicate records and to confirm pension amounts.

All of our tests had satisfactory results or the data was corrected. However, the tests may not have captured all deficiencies in the data. We have also relied on the Plan administrator's certification on the quality of the data.

The membership data used in the valuation may be summarized as follows:

| | January 1, 2024 | January 1, 2023 |
|---|---|---|
| **Active Members and Members on Leave and LTD** | | |
| Number | 21,594 | 20,974 |
| Average age at hire | 35.3 | 35.2 |
| Average age | 46.5 | 46.6 |
| Average years of pensionable service | 9.9 | 9.9 |
| Average pensionable earnings | $114,578 | $107,946 |
| Average capped pensionable earnings | $110,017 | $104,253 |
| **Deferred Vested Members** | | |
| Number | 6,088 | 5,888 |
| Number with a defined benefit pension | 4,849 | 4,572 |
| Average age | 51.0 | 51.1 |
| Average annual pension | $7,250 | $6,976 |
| Number with money purchase balance | 1,440 | 1,428 |
| Average money purchase balances | $119,892 | $124,347 |
| **Retired members and Survivors** | | |
| Number | 12,676 | 12,407 |
| Average age | 76.3 | 76.1 |
| Average annual lifetime pension[1] | $39,110 | $37,727 |

[1]Actual pension paid for pre-conversion Queen's retired members and survivors. True pension is used to value going concern liabilities

## Reconciliation of Membership Data

| | Active Members and Members on Leave & LTD | Retired members and survivors | Deferred Vested Members | Other | Total |
|---|---|---|---|---|---|
| **Members, January 1, 2023** | **20,974** | **12,407** | **5,888** | **111** | **39,380** |
| Changes due to: | | | | | |
| New entrants | 2,471 | - | - | - | 2,471 |
| Returned from deferred/retired | 12 | | (8) | (4) | - |
| Retirement | (438) | 568 | (130) | - | - |
| Termination | | | | | |
| Deferred vested | (821) | - | 839 | (18) | - |
| Lump sum | (609) | - | (511) | (19) | (1,139) |
| Pending | (1) | - | (2) | 3 | - |
| Death | | | | | |
| With a beneficiary(ies) | (2) | (146) | - | - | (148) |
| No further benefits | | (329) | - | - | (329) |
| Lump sum | (12) | (7) | (1) | (5) | (25) |
| Pending | | | | | - |
| New beneficiaries | - | 150 | 2 | (2) | 150 |
| Data correction | 20 | 33 | 11 | (16) | 48 |
| *Net change* | *620* | *269* | *200* | *(61)* | *1,028* |
| **Members, January 1, 2024** | **21,594** | **12,676** | **6,088** | **50** | **40,408** |

## Distribution of Active Members and Members on Leave and LTD

### As at January 1, 2024

| | Males | | | Females | | |
|---|---|---|---|---|---|---|
| Age | Number of Members | Average Years of Pensionable Service | Average Pensionable Earnings | Number of Members | Average Years of Pensionable Service | Average Pensionable Earnings |
| | | | $ | | | $ |
| <25 | 57 | 1.0 | 65,629 | 146 | 0.9 | 61,598 |
| 25-30 | 422 | 2.0 | 74,176 | 888 | 2.0 | 72,900 |
| 30-35 | 755 | 3.3 | 92,683 | 1,593 | 3.4 | 86,373 |
| 35-40 | 1,126 | 4.8 | 109,901 | 1,893 | 4.8 | 98,232 |
| 40-45 | 1,356 | 7.4 | 117,077 | 1,941 | 7.1 | 106,665 |
| 45-50 | 1,199 | 10.2 | 129,996 | 1,707 | 9.7 | 112,561 |
| 50-55 | 1,177 | 13.4 | 142,670 | 1,595 | 12.1 | 119,011 |
| 55-60 | 1,155 | 16.6 | 146,608 | 1,532 | 15.2 | 115,832 |
| 60-65 | 978 | 19.3 | 148,305 | 1,157 | 17.2 | 115,105 |
| 65+ | 496 | 22.4 | 179,592 | 421 | 20.2 | 148,546 |
| Total | 8,721 | 11.0 | 127,825 | 12,873 | 9.2 | 105,604 |

Average age: 46.5
Average pensionable service: 9.9

## Distribution Of Deferred Vested Members With Defined Benefit Pension

### As at January 1, 2024

| Age | Males | | Females | |
|---|---|---|---|---|
| | Number of Members | Average Lifetime Annual Pension | Number of Members | Average Lifetime Annual Pension |
| | | $ | | $ |
| <25 | 9 | 484 | 34 | 588 |
| 25-30 | 47 | 1,224 | 121 | 1,230 |
| 30-45 | 106 | 2,591 | 183 | 2,711 |
| 35-40 | 178 | 3,699 | 252 | 3,786 |
| 40-45 | 252 | 6,305 | 341 | 6,152 |
| 45-50 | 291 | 8,394 | 405 | 6,979 |
| 50-55 | 331 | 9,441 | 436 | 8,955 |
| 55-60 | 342 | 10,958 | 390 | 9,861 |
| 60-65 | 294 | 10,716 | 339 | 9,491 |
| 65+ | 302 | 5,740 | 196 | 4,396 |
| Total | 2,152 | 7,799 | 2,697 | 6,812 |

Average age: 51.0

## Distribution of Retired Members and Survivors

### As at January 1, 2024

| Age | Males | | Females | |
|---|---|---|---|---|
| | Number of Members | Average Lifetime Annual Pension[1] | Number of Members | Average Lifetime Annual Pension[1] |
| | | $ | | $ |
| <60 | 72 | 24,218 | 109 | 20,767 |
| 60-65 | 296 | 36,828 | 577 | 33,405 |
| 65-70 | 864 | 38,788 | 1,348 | 32,255 |
| 70-75 | 1,140 | 47,950 | 1,534 | 32,754 |
| 75-80 | 1,190 | 51,822 | 1,358 | 32,410 |
| 80-85 | 950 | 60,123 | 991 | 32,535 |
| 85+ | 974 | 52,868 | 1,273 | 26,030 |
| Total | 5,486 | 49,417 | 7,190 | 31,246 |

Average age: 76.3

[1]Actual pension paid for pre-conversion Queen's retired members and survivors. True pension is used to value liabilities.

# Appendix E: Plan Assets

## Reconciliation of Assets

The asset data used in the valuation were compiled as at January 1, 2024. We have relied on the audited financial statements for the fund prepared by UPP and audited by Pricewaterhouse Coopers LLP for the December 31, 2023 year-end.

Tests of reasonableness with respect to contributions, benefit payments and investment income have been performed on the asset data provided. However, the asset data has not been independently audited or verified.

The following is a reconciliation of the pension fund assets from January 1, 2023 to December 31, 2023.

| ($000's) | January 1, 2023 to December 31, 2023 |
|---|---|
| Market value as at beginning of year | $10,762,959 |
| Employee contributions | 218,228 |
| Employer contributions | 226,444 |
| Past service employer contributions | 61,162 |
| Special payments | - |
| Investment income | 1,084,245 |
| Pension payments | (483,067) |
| Lump sum payments | (75,434) |
| Transfers from other Plans | 14,395 |
| Transfer to other Plans | - |
| Investment fees and expenses | (52,185) |
| Non-investment fees and expenses | (37,313) |
| Total Market value as at end of year | $11,719,434 |
| Net rate of return for the period | 9.3% |

## Summary of Asset Allocation at January 1, 2024

The asset mix as at January 1, 2024 shown below was prepared by UPP for disclosure in the annual report.

| Classification | Notional Exposure ($000's) | Asset Mix % | Threshold Range in SIPP |
|---|---|---|---|
| Public Equity | 3,984,608 | 34.0% | 22% to 47% |
| Private Equity | 656,288 | 5.6% | 3% to 10% |
| Private Debt | 796,922 | 6.8% | 4% to 12% |
| Absolute Return | 1,101,627 | 9.4% | 5% to 15% |
| Infrastructure | 410,180 | 3.5% | 1% to 8% |
| Real Estate | 398,461 | 3.4% | 2% to 8% |
| Fixed Income | 4,898,723 | 41.8% | 25% to 50% |
| Inflation Sensitive Bonds | 0 | 0.0% | 0% to 10% |
| Cash and Short-Term Money Market (adjusted for derivatives) | (527,375) | (4.5%) | -12% to -5% |
| Total Market Value of Assets | $11,719,434 | 100.0% | |

# Appendix F: Development of Actuarial Value of Assets

| Total Plan ($000's) | 2021 | 2022 | 2023 | |
|---|---|---|---|---|
| Asset value at January 1 (July 1 for 2021) | 11,230,192 | 12,071,991 | 10,762,959 | |
| Total contributions, including transfers-in | 214,338 | 419,910 | 520,229 | |
| Total benefit payments | (253,832) | (550,557) | (558,501) | |
| Other adjustments | 0 | (429) | 0 | |
| Total investment income (net of fees) | 604,057 | (1,177,956) | 994,747 | |
| **Asset value at December 31** | **11,794,755** | **10,762,959** | **11,719,434** | **(A)** |
| Discount rate | 5.60% | 5.45% | 5.45% | |
| Expected asset value at December 31 | 11,504,590 | 12,595,267 | 11,310,225 | **(B)** |
| Gain/(loss) ***(A - B)*** | 290,165 | (1,832,308) | 409,209 | |
| Deferral of gain/(loss) - % | 25% | 50% | 75% | |
| Deferral of gain/(loss) - $ | 72,541 | (916,154) | 306,907 | |
| **Total deferral (2021 + 2022 + 2023)** | | | **(536,706)** | **(C)** |
| Actuarial value of assets ***(A - C)*** *(prior to money purchase asset adjustment)* | | | 12,256,140 | **(D)** |
| **Ratio of Actuarial Value of Assets to Market Value of Assets *(D / A)*** | | | **104.6%** | **(E)** |
| Queen's Money Purchase assets | | | 929,537 | **(F)** |
| Total market value of Plan assets related to DB benefits ***(A – F)*** | | | 10,789,897 | **(G)** |
| **Actuarial value of assets *(G x E + F)* *(after money purchase asset adjustment)*** | | | **12,215,769** | |

The adjusted value of assets is 104.6% of the market value of assets as of January 1, 2024 and the smoothing adjustment is ($496,335).

# Appendix G: Plausible Adverse Scenarios

A plausible adverse scenario is considered to be one that will occur in the short-term (immediately to one year) with a likelihood of occurring between 1 in 10 and 1 in 20 based on the opinion of the actuary. The purpose of the following scenarios is to illustrate the impact on the Plan's financial position of the following adverse but plausible assumptions relative to the best estimate assumptions selected for the Plan's going concern valuation. The purpose of disclosing these results is to demonstrate the sensitivity of the funded status and annual current service cost between the January 1, 2024 and the next valuation date to certain key risk factors affecting the Plan. The results of the scenarios selected are shown in the table below, with a description of each scenario following.

| | | Plausible Adverse Scenario Results at January 01, 2024 | | |
|---|---|---|---|---|
| | Going Concern Results at January 1, 2024 | Interest Rate Risk | Deterioration of Asset Values | Longevity Risk |
| Discount rate | 5.45% | 5.08% | 5.45% | 5.45% |
| Market value of assets | 11,719,434 | 12,306,277 | 10,491,237 | 11,719,434 |
| Actuarial value of assets | 12,215,769 | 12,396,919 | 11,833,854 | 12,215,770 |
| Actuarial liabilities | 11,966,492 | 12,619,939 | 11,869,077 | 12,234,783 |
| **Excess/(unfunded liability)** | **249,277** | **(223,020)** | **(35,223)** | **(19,013)** |
| *Change in excess/(unfunded liability)* | | *(472,297)* | *(284,500)* | *(268,290)* |
| **Current service cost** | **460,724** | **502,939** | **460,724** | **468,055** |
| *Change in current service cost* | | *42,215* | *-* | *7,331* |
| % change in market value of assets | | 5.01% | (10.48%) | 0.00% |
| % change in actuarial value of assets | | 1.48% | (3.13%) | 0.00% |
| % change in actuarial liabilities | | 5.46% | (0.81%) | 2.24% |
| % change in current service cost | | 9.16% | 0.00% | 1.59% |

## Interest Rate Risk

This scenario illustrates the sensitivity of the funded status of the Plan and current service cost to an immediate change in the market interest rates underlying fixed income investments.

In order to assess the impact of a decrease in interest rates of a magnitude consistent with a 1 in 10 likelihood of occurring, we have used the same stochastic model that is used to determine the going concern discount rate (see Appendix B). The stochastic model is based on 5,000 simulations of projected financial variables, including long-term yields on fixed income investments and asset class returns. Our long-term best estimates for these variables, and the going concern discount rate are based on the median values over these 5,000 simulations.

To determine the sensitivity to interest rate risk, and the resulting impact on Plan assets and liabilities, we have:

- considered the hypothetical going concern discount rate over the 500 trials where fixed income yields are lowest at the one-year horizon,
- determined the decrease in median long-term fixed income yields over the 500 trials where fixed income yields are the lowest at the one-year horizon.

As such, under the interest rate risk scenario, the going concern discount rate is decreased by 37 basis points as of January 1, 2024. With respect to the impact on fixed income assets, the scenario results in a decrease in yields on fixed income investments of 0.80%.

Based on the estimated duration of the Plan assets, liabilities and the current service cost, we have then determined the estimated change to the Plan's funded status under the interest rate risk scenario.

The change in the market value of Plan assets has been reflected in the money purchase account balances for Queen's pre-conversion date benefits as well as the smoothed value of assets. The change in the value of the money purchase account balances was assumed to have an immaterial impact on the defined benefit liabilities of the Plan and therefore has not been reflected.

## Deterioration of Asset Values

This scenario illustrates the sensitivity of the funded status of the Plan to a short-term economic shock which causes a reduction in the market value of non-fixed income assets, with no change to the liabilities of the Plan. This scenario is assumed not to impact the current expectation of the long-term rate of return, and consequently, the going concern discount rate.

In order to assess the impact of a decrease in asset values of a magnitude consistent with a 1 in 10 likelihood of occurring, we have used the same stochastic model that is used to determine the going concern discount rate (see Appendix B). The stochastic model is based on 5,000 simulations of projected financial variables, including long-term yields on fixed income investments and asset class returns.

To determine the sensitivity to a deterioration in asset values, based on the Plan's target asset mix, we have determined the decrease in median investment returns over the 500 trials where non-fixed income investment returns are the lowest at the one-year horizon.

As such, under the deterioration of asset values scenario, the market value of assets is decreased by 10.48% as of January 1, 2024.

The change in the market value of Plan assets has been reflected in the money purchase account balances for Queen's pre-conversion date benefits as well as the smoothed value of assets. The change in the value of the money purchase account balances was assumed to have an immaterial impact on the defined benefit liabilities of the Plan and therefore has not been reflected.

## Longevity Risk

This scenario illustrates the sensitivity of the funded status of the Plan to members living longer than expected. The impact of this scenario was determined using a one-year age setback to the mortality table used for the going concern valuation as of January 1, 2024; that is, a more conservative mortality assumption than currently employed.

For the purposes of calculating the Queen’s pre-conversion liabilities, it was assumed that the assumptions used to convert the money purchase accounts to a pension did not change.

# Appendix H: Certificate of Administrator

With regards to the January 1, 2024 actuarial report for the University Pension Plan Ontario, I hereby certify, in my capacity as an officer of the University Pension Plan Ontario, and not in my personal capacity that, to the best of my knowledge and belief:

The significant terms of engagement contained in Section 1 of this report are accurate and reflect the Plan administrator's direction with respect to this valuation;

The Summary of the Plan Provisions contained in Appendix A of this actuarial report is a complete and accurate summary of the terms of the Plan which affect the funding requirements;

The membership data provided to the actuary includes a complete and accurate description of every person who is entitled to benefits under the terms of the Plan for service up to January 1, 2024;

The asset data provided or made available to the actuary is complete and accurate; and

All events subsequent to January 1, 2024 that may have an impact on the valuation have been communicated to the actuary.

**Barbara Zvan**
CEO & President

September 24, 2024
Date