Board of Governors
PENSION & BENEFITS COMMITTEE
Friday 17 January 2020
9:30 a.m. to 12:00 noon
NH 3318

Time	No.	OPEN SESSION	ACTION
9:30	1.	Approval of the 13 December 2019 Minutes (Open Session)* and Business Arising	Decision
	2.	Execution Against the Work Plan* [Grivicic]	Information
	3.	Update on Government Pension Plan Initiatives [Shapira]	Information
9:40	4.	Recommendation for Changes to UW Pension Plan* [Shapira/Byron]	Recommendation To BOG
		a. Pension Information Sessions, December 2019 – Distillation of Comments/Questions Received from Those in Attendance*	Information
10:10	5.	Approval of Actuarial Valuation Assumptions* [Byron/Shapira]	Decision
10:40	6.	Investment Status of Payroll Pension Plan* [Hadley]	Information
10:50	7.	Update re: Holistic Benefits Working Group	Information
11:00	8.	Other Business	
		a. Labelling of "Private and Confidential" on Aon materials in agenda, adding "Posted with Permission of Aon" [Shapira]	Information
		CONFIDENTIAL SESSION	
	9.	Approval of the 13 December 2019 Minutes (Confidential)+ and Business Arising	Decision

Next Meeting: Friday 21 February 2020, 9:30 a.m. – 12:00 noon in NH 3318

*attached
** to be distributed
+ distributed separately

14 January 2020

Mike Grivicic
Associate University Secretary

Please convey regrets to Melissa Holst at 519-888-4567 x36125 or mjholst@uwaterloo.ca

Future Agenda Items
a. Pension Contribution for Members of LTD
b. Level of LTD coverage vs. practical requirements

University of Waterloo
Board of Governors
PENSION & BENEFITS COMMITTEE
Minutes of the 13 December 2019 Meeting
[in agenda order]

Present: Peter Barr, Terrence Birmingham, Ted Bleaney, Mike Grivicic (secretary), Michael Herz, Dennis Huber, Ranjini Jha, Jim Rush, David Saunders, Michael Steinmann, Mary Thompson, Ken Vetzal

Absent: David Kibble*, Marilyn Thompson*
*regrets

Consultant: Linda Byron, Allan Shapira (by phone)

Resources: Sarah Hadley, Michelle Hollis, Lee Hornberger, Sue McGrath

Organization of Meeting: Peter Barr took the chair, and Mike Grivicic acted as secretary. The secretary advised that a quorum was present.

1. APPROVAL OF THE 15 NOVEMBER 2019 MINUTES (OPEN SESSION) AND BUSINESS ARISING

A motion was heard to approve the minutes. Saunders and Thompson. Carried. There was no business arising.

2. EXECUTION AGAINST THE WORK PLAN

This item was received for information.

3. UPDATE ON GOVERNMENT PENSION PLAN INITIATIVES

Shapira noted that Bill 132 received royal assent, and that the teachers' unions charter challenge to Bill 124 is proceeding.

4. MAXIMUM PENSION LIMITS AND CAPS – RPP AND PPP

McGrath provided an overview of the material distributed. Member clarified that prospective changes to contribution rates would also impact caps and that contributions are capped based on estimated final salary vs. average final salary; given the latter, an amendment may be required in 2020.

5. PENSION RISK MANAGEMENT DASHBOARD AS OF SEPTEMBER 30, 2019

Byron spoke to the dashboard: funded status of the pension plan on the bases of going concern, solvency, and wind up; discount rate assumptions, and markets suggest that the discount rate might be more correctly ~10 basis points lower; calculation of provision for adverse deviation is linked to the discount rate, asset mix, plan design and other factors, and is considered to be very date-sensitive. Members discussed: fixed income durations in Waterloo plan are typical of those seen in the sector; potential to increase alignment between assets and liabilities durations; relative health of plan may create good conditions for filing with the regulator based on the January 1, 2020 valuation; impacts of wider credit spreads; some of the plan's risk is mitigated by building special payments into the operating budget.

6. INVESTMENT FUND PERFORMANCE REPORTS FROM AON – Q3 2019

Huber observed: relative performance of various investments and investment managers; certain managers are seen to be trailing beyond the short term, and greater attention to these managers is expected in the new year. Members expressed an interest in having longer time period for comparison, as well as to assess performance net of fees.

7. DISCUSSION RE: PENSION INFORMATION SESSIONS

Shapira provided some initial impressions from the first set of sessions, and noted that more are coming in the next week. Members who were in attendance expressed a view that people were interested in the details of the proposed changes, and no discernable pushback was evident. Members discussed: it is helpful to illustrate the impacts of potential changes for a variety of particular cases e.g. at gross salary of $50,000, at $70,000 etc.; potential increases to pension contributions would be timed to coincide with pay increases; main driver of changes is to restore 50:50 contributions overall between employees and employer, and that fact should be accentuated. Aon will develop a short document to explain the changes, which will be included on the webpage posting the video of the presentation.

8. UPDATE RE: HOLISTIC BENEFITS WORKING GROUP

Hornberger provided an overview of the draft analysis which was distributed to members separately ahead of the meeting. Members noted: overall desire for changes to the benefits package, with changes to be cost-neutral; strong desire expressed to increase vision coverage; some willingness to pay for improvements is evident, and that could be implemented via deductibles for certain benefits; retirees and employees with temporary status strongly support adding dental for their coverages; potential for complication in offering dental coverage to retirees due to wording in Policy 23; ~3000 comments received as part of survey, and Hornberger is leading work to glean observations and trends from this data. Members suggested additional analysis by single coverage vs. family coverage would be informative to the working group. It is anticipated that a recommendation might be able to come to this committee in Spring 2020, with focus groups over the summer months and a potential recommendation to the Board in the fall 2020.

9. OTHER BUSINESS

Jha spoke to the items pertaining to the Pension Investment Committee, noting that the external members have been secured and are outstanding appointments for the committee.

Members noted that the September and October 2020 committee meetings have relatively little time between them, and suggested that perhaps a week or two be added in that regard.

With no further business in open session, the committee proceeded into confidential session.

NEXT MEETING

The next meeting is scheduled for Friday 17 January 2020, 9:30 a.m. – 12:00 noon in NH 3318.

10 January 2020

Mike Grivicic
Associate University Secretary

Execution against Work Plan

Pension & Benefits Committee, Board of Governors, University of Waterloo

The below represents the annual responsibilities of the P&B Committee and has been prepared as an aid to planning only. The committee's activities are much broader, however, and include: legislative changes, plan changes and improvements; selection of managers and service providers; and requests from the UW community regarding pension and benefits plans.

Task	**Frequency (Target month)**	**18 Jan 2019**	**22 Feb 2019**	**8 Mar 2019**	**16 May 2019**	**14 June 2019**	**20 Sept 2019**	**18 Oct 2019**	**15 Nov 2019**	**13 Dec 2019**	**17 Jan 2020**
Approval of Actuarial Valuation Assumptions	Annual (Jan)	✓									✓
Investment Status of PPP	Annual (Jan)	✓									✓
Cost-of-living Increase for Pensioners	Annual (Feb)		✓								
Pensions for Deferred Members	Annual (Feb)		✓								
Salaries for Pension Purposes for Individuals on Long-term Disability	Annual (Feb)		✓								
Actuarial Valuations (RPP and PPP), with posting to website once approved	Annual (Mar)			✓							
Review of Contribution and Protocol Caps (RPP and PPP)	Annual (Mar)			✓							
Benefits Plan Premium Renewals	Annual (Mar)			✓							
Indexing of Long-term Disability Plan Benefits and Maxima	Annual (Mar)			✓							
Annual Committee Self-Assessment	Annual (Mar)			✓							
Budget Overview	Annual (May)				✓						
Previous Years' Fees and Expenses	Annual (May)				✓						
Annual Audit of the Pension Plan Fund Financial Statements	Annual (May)				✓						

D = deferred

Task	Frequency	18 Jan 2019	22 Feb 2019	8 Mar 2019	16 May 2019	14 June 2019	20 Sept 2019	18 Oct 2019	15 Nov 2019	13 Dec 2019	17 Jan 2020
Benefits Utilization Report	Annual (June)					✓					
Annual review re: benefits added/removed from insured plans in the market	Annual (June)					✓					
Review of Committee Terms of Reference	Annual (June)										
Indexing of Plan Maxima – Health, Dental, Retiree Life Insurance	Annual (Nov)								✓		
Employee and Family Assistance Program – report on utilization	Annual (Nov)								✓		
Maximum pension limits and caps adjustments, based on average industrial wage increase (AIW)	Annual (Dec)									✓	
Total Fund Overview	Quarterly		✓		✓			✓		✓	
Investment Manager Review	Semi-annually										
Approval of the Statement of Investment Policies and Procedures (SIPP)	Annual								✓		
Annual Report to the Community	Annual	✓	✓								
Actuarial Filing Minimum every three years - most recent filings in 2017 and 2018											

Amendments to the University of Waterloo Pension Plan

Motion

That the Board of Governors approve the attached resolution amending the University of Waterloo Pension Plan ("UW Pension Plan") to increase member contribution rates and increase the pension cap as described in this report.

Background

Member contribution rates to the UW Pension Plan were last increased in 2013, along with changes to the future service benefit provisions. These increases/changes created a 50/50 sharing of the cost of benefits being earned each year (current service cost) between members and the University. Since that time, the current service cost has increased as a result of the decrease in interest rates and lower expected future investment returns, the increase in the pension payment period as a result of improved longevity, and new funding rules in Ontario. As a result, member contribution rates now only cover 43% of the total current service cost. The Pension & Benefits Committee is recommending an increase in member contribution rates, which will be phased in over three years, to restore the sharing back to 50/50 once the increase is fully phased-in. The UW Pension Plan currently places a pension cap of $3,200 per year of pensionable service on the indexed maximum pension under the *Income Tax Act* (ITA). The pension cap has been periodically increased in the past as the indexed ITA maximum pension approaches the cap. With the ITA maximum pension in 2020 at $3,092 per year of pensionable service, the Pension & Benefits Committee is recommending an increase in the pension cap to $3,400 per year of pensionable service, and introducing an element of automatic escalation in the cap.

The Pension & Benefits Committee spent many months in 2019 considering options and potential impacts of changes on Plan members and the health of the Plan. The Committee held five public information sessions on two different days over two weeks in December 2019, and posted the slides and a video of the presentation.

The recommended amendments are as follows:

1. Effective May 1, 2020, member contribution rates to increase as follows over a three-year period:

		Contribution Rates Effective:		
Portion of Salary	**Current Contribution Rates**	**May 1, 2020**	**May 1, 2021**	**May 1, 2022**
Less than 1 x YMPE[1] (Less than $58,700 in 2020)	**6.25%**	**6.95%**	**7.40%**	**7.80%**
		0.70%	0.45%	0.40%
Between 1 x and 2 x YMPE (Between $58,700 and $117,400 in 2020)	**8.95%**	**9.95%**	**10.60%**	**11.20%**
		1.00%	0.65%	0.60%
Above 2 x YMPE (Above $117,400 in 2020)	**9.95%**	**9.95%**	**10.60%**	**11.20%**
		0.00%	0.65%	0.60%

[1] Year's Maximum Pensionable Earnings under the Canada Pension Plan

2. Effective January 1, 2021, the pension cap applied under the UW Pension Plan on the indexation of the ITA maximum pension will be increased from $3,200 to $3,400 per year of pensionable service, and automatically increased each calendar year thereafter by one-third of the percentage increase in the Average Industrial Wage.

Financial Impact

The total current service cost, including the change to the cap, is 17.8% of salaries. The increase in member contribution rates once fully phased-in will increase the average member contributions from 7.4% of salaries to 8.9% of salaries. The University current service cost will decrease from 9.6% of salaries to 8.9% of salaries, restoring the 50/50 sharing of current service cost. The University is currently making special payments of 2.8% of salaries to toward the funding shortfall under the UW Pension Plan. The increase in the pension cap along with the escalation feature will result in a net increase to the funding shortfall of $31 million. The reduction in University current service cost of 0.7% of salaries will be added to the University special payments to bring them up to 3.5% of salaries. This means that the total University contributions (current service cost plus special payments) will remain the same at 12.4% of salaries. With higher member contributions and the same University contributions, more funding will be going into the UW Pension Plan to enhance Plan sustainability.

Impact on Payroll Pension Plan

There will be no change to the Payroll Pension Plan which provides pension benefits above the ITA maximum pension, outside of the registered pension plan, up to $3,400 per year of pensionable service. As a result, with the increase in the pension cap under the UW Pension Plan to $3,400 per year of pensionable service, there will be no further benefits earned under the Payroll Pension Plan once the ITA maximum pension reaches $3,400.

Pension Information Sessions – December 2019

→ Estimated total attendance across five sessions: ~380

Distillation of Comments/Questions Received from Those in Attendance

- Why eliminate third tier of contributions? (x3)
  - Third tier reflected the presence of the payroll pension plan
  - With changes, the PPP would be expected to be subsumed over time into the registered plan, and two contribution tiers would follow convention at similar institutions
  - This does not reduce university contributions
- What is the balance of contributions between employees and employer when excluding payroll pension plan?
  - Likely would increase toward employees, perhaps 1% shift
- How long until the plan is fully funded under the proposed changes?
  - If the deficit is $100M and without significant shifts in market conditions, 7-10 years would be reasonable
  - With special payments this may be shortened by a year or two
- Why not remove pension caps entirely?
  - This would add about $70 million to the actuarial liability of the registered plan
  - Caps protect against arbitrary changes coming from the government, allows the plan to have the tools to deliver on pension promises
  - This proposal essentially gets the plan halfway to there
- Attendees requested examples to clarify on how caps, payroll pension plan operate for individuals
- Comparison of benefits vs. contribution rates between the example universities given in the presentation
- Increases would be made equally across employees' pay, and not all at once on 1 May of a given year
- Timing of changes
  - Other universities bargain pensions as part of the larger collective bargaining exercise
- Waterloo was awaiting new funding rules from the regulator before proceeding with changes
- How is 50:50 contribution balance maintained over time?
  - The university is responsible for any plan deficits so in theory the balance could move from 50:50 if the plan is funded at a surplus level
  - When plan valuations are filed with the regulator, the consulting actuaries need to certify the levels of special payments
  - Contributions are built into the base operating budget to exceed the minimum payments
  - If the plan were to be fully funded, the plan could also reduce the risk in the plan's investments rather than change contribution levels
- Any discussion to increase the benefits rate up to the YMPE from 1.4% to 1.6%
  - This would require greater contributions and currently the amount of funding required adds up to about 20% of salary, which is significant
- Are calculations based on indefinite growth of the university?
  - No, rather on current membership
  - There is regular examination of impacts on the plan for hypothetical increases/decreases in membership
- Has this proposal been brought to those involved in salary negotiations?
  - No, this is always done separately from the salary negotiation process

- Asset mix
    - Our asset mix is similar to others in the sector, likely more conservative with greater exposure to fixed income
    - Bond prices have increased with decreases in bond yields – however gains in bond prices are obtained at the expense of future returns, since reinvestment of fixed income occurs at lower forward rates
- How has the pension plan performed?
    - About 10.4% return year to date, even with relatively more conservative asset mix
    - Overall low fees are supported by exposure to investments that are self-managed
    - Overall performance compares well to other institutions
- Where does the plan stand on the question of divesting from fossil fuels?
    - No provision of divestiture
    - The Statement of Investment Policies and Procedures was amended in 2017 to allow for account of environmental, social and governance (ESG) factors in investment decisions, and this was done for all university investment funds
    - The university also anticipates becoming a signatory to the UN Principles of Responsible Investment in 2020, and all the plan's investment managers are signatories
- Plan administrative costs are around 36 basis points of assets overall; investment management fees average 21 basis points in 2019, plus the costs of audited financial statements, custodians for investments
    - The Pension & Benefits Committee reviews costs annually

- Are other universities at a state of sharing pension plan contributions 50:50 between the employees and the employer?
    - Some are, and it depends on how this is measured, but all plans target this. In fact, the 2012 Ontario budget included language affirming this and strongly suggesting this be the norm
- Other universities have different pension plans for faculty and staff
    - This is true
    - Some universities have one plan, but have different provisions in the plan for faculty and staff
- There is no minimum for years of services to retire from the Waterloo plan. Some other plans do have minimum service requirements
- If in the future there was a decision to move away from a defined benefits plan, how are benefits paid?
    - Benefits are paid per the provisions of the plan in the date ranges they were accrued
    - Benefits cannot be changed retroactively, and this helps to prevent intergenerational inequalities
- Why not add contributions to benefits package?
    - These recommendations relate to the pension plan, to promote the health of the plan
    - Cannot trade pension funds for health benefits, any extra pension funding will be in place to let the plan adapt to future changes/needs
- Is there any merit to joining the University Pension Plan? (new joint plan formed with with Toronto, Guelph and Queen's as inaugural members)
    - It is likely that every Ontario university will consider this question at some point
    - Significant effort to form the new plan, also would involve effort to integrate new members
    - The new joint plan will place assets with Investment Management Corporation of Ontario (IMCO), which is expected to enjoy benefits of scale with strong investment management services and other advantages

Actuarial Assumptions

University of Waterloo Pension & Benefits Committee Meeting

January 17, 2020
Posted with Permission of Aon

Prepared by Retirement & Investment

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About This Material

- Review of actuarial assumptions for purposes of setting the actuarial assumptions to use for the January 1, 2020 actuarial valuation of the Registered Pension Plan (RPP) and Payroll Pension Plan (PPP)
- The January 1, 2020 actuarial valuation of the RPP is not required to be filed with the pension regulators (Financial Services Regulatory Authority and Canada Revenue Agency); it is prepared for Plan management purposes although the University may elect to file the January 1, 2020 valuation
- Under the funding rules which came into effect May 1, 2018 for Ontario-registered pension plans:
  - Going concern assumptions should be “best estimate”
  - An explicit provision for adverse deviation (PfAD) is added to the best estimate non-indexed going concern liabilities and normal cost
- Pending approval by the Board of Governors, the impact of the proposed changes to member contributions and the RPP Cap will be included in these valuation results

Actuarial Assumptions For Going Concern Valuation

Assumptions to Estimate:			
When Pension Benefits are Payable	**Amount of Pension Benefits Payable**	**How Long Pension Benefits are Payable**	**How Much Money to Set Aside**
▪ Termination Rates ▪ Disability Rates ▪ Preretirement Mortality Rates ▪ Retirement Ages	▪ Increases in CPP Wage Base ▪ Increases in *ITA* Maximum Pension ▪ Increases in Salaries ▪ Inflation	▪ Postretirement Mortality Rates	▪ Investment Return on Pension Fund
Demographic Assumptions	**Economic Assumptions**	**Demographic Assumptions**	**Economic Assumptions**

Real Growth

Benefits

Assets

Pension Benefits Before Retirement
- CPP Wage Base increases
- ITA maximum pension increases
- Salary increases

Inflation

Investment Return on Various Assets Classes

Pension Benefits After Retirement
- Indexation

Since inflation drives both the pension benefits paid out and the funding made from investment return, it is the excess of interest rates and investment return over inflation, or "real return" and the excess of salary and government benefit increases over inflation that are the key factors.

Actuarial Assumptions For Going Concern Valuation—Economic Assumptions – Prior Valuations

Economic Assumptions	January 1, 2018 Valuation (Last Filed Valuation)	January 1, 2019 Valuation
Increase in Consumer Price Index (CPI)	2.00% per year	No change
Increase in Year's Maximum Pensionable Earnings under Canada Pension Plan	2.75% per year (CPI + 0.75%)	No change
Increase in *Income Tax Act* Maximum Pension	$2,944.44 in 2018; increased at 2.75% per year up to $3,200.00	$3,025.56 in 2019; increased at 2.75% per year up to $3,200.00
Increase in Salaries	4.00% per year (CPI + 2.00%[1])	No change
Increase in Salaries (Disabled)	2.00% per year (CPI + 0.00%)	No change
Interest Rate Used to Discount Liabilities	5.60% per year (CPI + 3.60%)	5.70% per year (CPI + 3.70%)
Interest Rate Used to Calculate 50% Rule	1.30% per year for 10 years[2]; 1.50% per year thereafter	1.60% per year for 10 years[2]; 1.70% per year thereafter
Interest Rate for Crediting on Required Member Contributions	3.00% per year	No change
Loading For Administrative Expenses	Explicit assumption for $1,500,000 in 2018 added to current service cost	Explicit assumption for $1,560,000 in 2019 added to current service cost
Provision for Adverse Deviation	6.95% of non-indexed liabilities and current service cost (based on actual asset mix)	8.50% of non-indexed liabilities and current service cost (based on target asset mix)

[1] Reflects PTR/grid steps/merit

[2] 1.70% per year for 10 years: 1.90% per year thereafter for 75% indexed benefits in 2018; 1.90% per year for 10 years: 2.10% per year thereafter for 75% indexed benefits in 2019

Actuarial Assumptions For Going Concern Valuation—Demographic Assumptions – Prior Valuations

Demographic Assumptions	January 1, 2018 and January 1, 2019 Valuations	
Retirement Age	Age 64, but no earlier than one year after valuation date	
Mortality Rates	2014 Canadian Pensioners Combined Table ("CPM2014 Combined") with Improvements Under Scale MI-2017	
Termination Rates	**Age**	**Rates Per 100**
	20	10.0
	25	10.0
	30	5.6
	35	3.2
	40	2.2
	45	1.7
	50	1.2
	55	0.7

Increase in Consumer Price Index (CPI)

- As of December 31, 2019, underlying inflation rate implicit in the market yield of Government of Canada real return bonds (0.41%) and nominal bonds (1.76%) is 1.35%
- Bank of Canada target range for inflation extends from 1% to 3%; monetary policy aimed at the 2% target midpoint
- Assumption for increase in CPI has been set at 2.00% per year since the January 1, 2015 actuarial valuation; other economic assumptions build off of the inflation rate

Increase in Pensionable Earnings

- Increase in pensionable earnings of 4.00% per year based on:
  - Assumed across-the-board increase of 2.00% per year
  - Assumed 2.00% increment representing PTR/grid steps/merit across Faculty and Staff groups

Discount Rate

- Based on expected investment return of UW pension fund reflecting long-term asset mix
- For purposes of calculating expected investment return, the following long-term target asset mix has been used:

Canadian Equities:	15.0%
Non-Canadian Equities:	40.0%
Nominal Fixed Income:	33.0%
Real Estate:	5.0%
Infrastructure:	5.0%
Cash:	2.0%

Discount Rate (cont'd)

- For 2018 filed actuarial valuation, the target asset mix generated an expected return of 5.60% per annum net of passive expenses and before other administration expenses
- For the 2019 actuarial valuation, the target asset mix generated an expected return of 5.70% per annum net of passive expenses and before other expenses
- For the 2020 actuarial valuation, the target asset mix generates a preliminary expected return of 5.60% per annum before expenses:
  - Assumption of 5.60% reflects a provision for passive investment expenses and no additional provision for adverse deviation or administrative expenses
  - These results are based on Aon's September capital market assumption with an adjustment for lower expected bond returns, and may be adjusted once the December capital market assumptions are available (late February)

Provision for Expenses

- An explicit provision for administrative expenses is added to the normal cost as follows:

  2018 → $1,500,000

  2019 → $1,560,000

  2020 → $1,622,000

- Prior to 2018 the administrative expenses were accounted for as an adjustment to the discount rate

Retirement Age Experience

- The following table shows the ages at retirement for retirements during 2010 through 2019 inclusive:

	Faculty	Staff	Total
< Age 60	14	67	81
Age 60 but less than Age 61	6	39	45
Age 61 but less than Age 62	11	29	40
Age 62 but less than Age 62.25	12	77	89
Age 62.25 but less than Age 63	13	60	73
Age 63 but less than Age 64	10	51	61
Age 64 but less than Age 65	17	51	68
Age 65 but less than Age 65.25	19	165	184
Age 65.25 but less than Age 66	25	48	73
Age 66 but less than Age 67	28	41	69
Age 67 but less than Age 68	15	17	32
Age 68 but less than Age 69	7	13	20
Age 69 but less than Age 70	14	12	26
Age 70+	32	17	49
Total	**223**	**687**	**910**

Retirement Age Assumption

- The valuation uses a single point retirement age of 64 but no earlier than one year following the valuation date. This assumption generates a full year of current service cost for all active members including those already at assumed retirement age
- Consider moving to retirement rates, shown on the following page

Retirement Age Assumption

Age	Retirement Rate	% of Retirements
60	5% (with 6% reduction from age 62)	5.0%
61	5% (with 6% reduction from age 62)	4.7%
62	25%	22.6%
63	10%	6.%
64	10%	6.1%
65	50%	27.4%
66	25%	6.8%
67	25%	5.2%
68	25%	3.8%
69	50%	5.8%
70	100%	5.8%

Mortality Rates

- Current mortality table being used is CPM 2014 Combined Table With Generational Projection Under Scale MI-2017
- Following table shows actual versus expected deaths for members of the RPP for 2012 through 2019:

	2012	2013	2014	2015	2016	2017	2018	2019*	Total
Actual Deaths	54	53	57	51	57	53	62	42	429.0
Expected Deaths (CPM 2014 Combined Table with Generational Projection Under Scale CPM–B)	51.4	55.3	57.7	59.3	60.6	64.8	67.2[1]	52.6[1]	468.9

- Actual deaths over 8-year period (2012–2019) is 91% of expected deaths
- Actual deaths over 7-year period (2013–2019) is 90% of expected deaths
- Mortality losses may result if demographic profile of pensioner deaths is different from expected
- Consider moving to 2014 Canadian Pensioners Public Table (“CPM2014 Public”) with Improvements Under Scale MI-2017

* as of September 30, 2019
[1] Based on CPM 2014 Combined Table with Generational Projection Under Scale MI-2017

Provision for Adverse Deviation (PfAD)

	Target Asset Mix
Canadian Equities	15%
Global Equities	40%
Fixed Income / Cash	35%
Real Estate (REITs)	5%
Infrastructure (Listed)	5%

- Fixed Income Allocation for PfAD and BDR = 35%
- PfAD = Base component of 4% (open plan) plus asset-based component, plus a component related to the Benchmark Discount Rate (BDR)
- The January 1, 2019 valuation used a PfAD of 8.50% based on target asset mix
  - Valuations performed or and after December 30, 2019 must use target asset mix to determine the PfAD
  - Last year, the infrastructure was counted as 50% fixed income; clarification from FSRA indicates listed infrastructure would be counted as 100% non-fixed income

Provision for Adverse Deviation (PfAD) (cont'd)

As a % of Going Concern Liabilities and Normal Cost

Fixed Component

Closed Plans: 5%
Open Plans: 4%

+

Asset Mix Component

% of non-fixed income	Closed Plans	Open Plans
0%	0%	0%
20%	2%	1%
40%	4%	2%
50%	5%	3%
60%	7%	4%
70%	11%	6%
80%	15%	8%
100%	23%	12%

+

Discount Rate Component

Duration x (Best Estimate Discount Rate – BDR[1])

Open Plan — 4%

35.0%/65.0% Fixed Income/ Non-Fixed Income — 5.0%

Best Estimate Discount Rate: 5.6%
BDR: 6.0% — 0%

9.0% PfAD

[1] Benchmark Discount Rate = V39056 Rate (1.70% at January 2, 2020)+ 5% x % of Non-Fixed Income + 1.5% x % of Fixed Income + 0.5% for diversification

Preliminary Actuarial Assumptions For January 1, 2020 Going Concern Valuation—Economic Assumptions

Economic Assumptions	January 1, 2020 Valuation
Increase in Consumer Price Index (CPI)	2.00% per year
Increase in Year's Maximum Pensionable Earnings under Canada Pension Plan	2.75% per year (CPI + 0.75%)
Increase in *Income Tax Act* Maximum Pension	$3,092.22 in 2020; increased at 2.75% per year up to $3,400.00 (pending approval of plan changes)
Increase in Salaries	4.00% per year (CPI + 2.00%[1])
Increase in Salaries (Disabled)	2.00% per year (CPI + 0.00%)
Interest Rate Used to Discount Liabilities	5.60% per year (CPI + 3.60%)
Interest Rate Used to Calculate 50% Rule	1.20% per year for 10 years[2]; 1.20% per year thereafter
Interest Rate for Crediting on Required Member Contributions	2.50% per year
Loading For Administrative Expenses	Explicit assumption for $1,622,000 in 2020 added to current service cost
Provision for Adverse Deviation	9.00% of non-indexed liabilities and current service cost (based on target asset mix)

[1] Reflects PTR/grid steps/merit
[2] 1.50% per year for 10 years: 1.60% per year thereafter for 75% indexed benefits

Preliminary Actuarial Assumptions For January 1, 2020 Going Concern Valuation— Demographic Assumptions

Demographic Assumptions	January 1, 2020	
Retirement Age	Consider moving to retirement rates	
Mortality Rates	Consider moving to 2014 Canadian Pensioners Public Table (“CPM2014 Public”) with Improvements Under Scale MI-2017	
Termination Rates	**Age**	**Rates Per 100**
	20	10.0
	25	10.0
	30	5.6
	35	3.2
	40	2.2
	45	1.7
	50	1.2
	55	0.7

Actuarial Assumptions For Solvency and Wind-Up Valuations

Assumptions	January 1, 2018 (Last Filed Valuation)	January 1, 2019	January 1, 2020
Retirement Ages	Age between 55 and 65 that produces highest value	No change	No change
Mortality Rates	CPM2014 Combined with Generational Improvements Under Scale CPM-B	No change	No change
Interest Rates— Solvency Valuation (Per Year)			
Active Members Age 55 and Over, Pensioners and Deferred Pensioners[1]	3.03%	3.23%	3.06%[3]
Active Members Under Age 55[2]	2.80% for 10 years; 3.30% thereafter	2.80% for 10 years; 3.20% thereafter	2.50% for 10 years; 2.60% thereafter
Interest Rates— Wind-Up Valuation (Per Year)			
Active Members Age 55 and Over, Pensioners and Deferred Pensioners[1]	-0.13% (100% indexed) 0.66% (75% indexed)	0.08% (100% indexed)[3] 0.87% (75% indexed)[3]	-0.29% (100% indexed)[3] 0.55% (75% indexed)[3]
Active Members Under Age 55[2]	1.30% for 10 years; 1.50% thereafter (100% indexed) 1.70% for 10 years; 1.90% thereafter (75% indexed)	1.60% for 10 years; 1.70% thereafter (100% indexed) 1.90% for 10 years; 2.10% thereafter (75% indexed)	1.20% for 10 years; 1.20% thereafter (100% indexed) 1.50% for 10 years; 1.60% thereafter (75% indexed)

[1] Settled through annuity purchase
[2] Settled through commuted value
[3] Depends on release of final guidance from Canadian Institute of Actuaries for January 1, 2020 actuarial valuations

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TD Asset Management

Portfolio Report

For the Month Ended: December 31, 2019

Account Name: The University of Waterloo Payroll Plan

Account Number: 45420

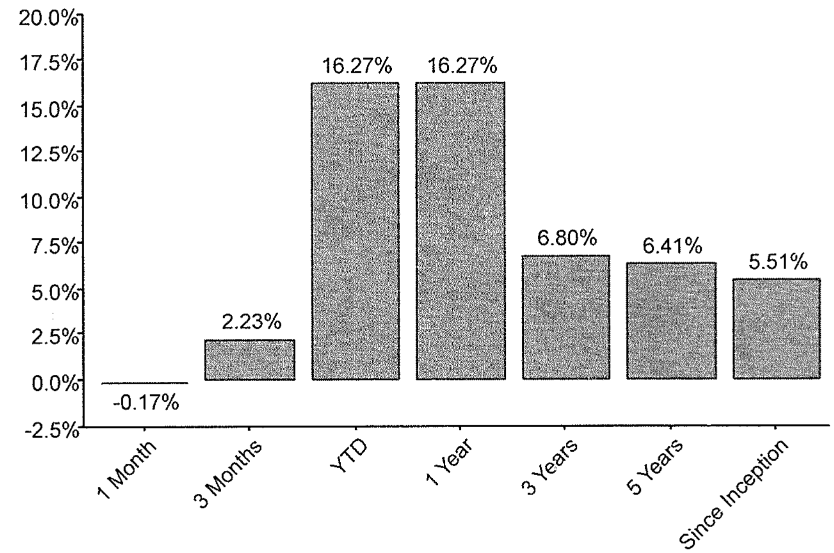
Summary

Account inception date: July 31, 2000

At a glance

Fund Name	Inception Date	Market Value
TD Emerald Canadian Bond Index Fund, Class B	Jul 31 2000	$16,933,719
TD Emerald Canadian Equity Index Fund, Class B	Jul 31 2000	$17,596,597
TD Emerald International Equity Index Fund, Class B	Jul 31 2000	$2,255,375
TD Emerald U.S. Market Index Fund, Class B	Jul 31 2000	$6,874,228
Total Market Value of Portfolio		**$43,659,919**

Total Portfolio Performance



Income Summary - Year To Date

Description	
Interest Income	$718,233.61
Dividend Income	$529,669.12
Capital Gains/(Losses)	$479,909.30

Q4/19 Quarterly Market Review - Summary

Highlights

Canadian & U.S. Fixed Income

- The Canadian government bond index was down 1.20% in Q4/19 (-0.44% y/y), underperforming the comparable U.S. government bond index, which retreated 0.80% (+6.86% y/y).
- Canadian and U.S. corporate bond indices registered returns of 0.06% and 1.20%, respectively (8.05% and 14.54% y/y).
- The credit spread for corporate BBB issuers and high-yield issuers in the U.S. tightened over the quarter.
- The Bloomberg Barclays U.S. Corporate High Yield Index returned 2.61% in Q4 (14.32% y/y).

Canadian Equities

- Canadian equity markets in Q4 recovered after weak U.S. manufacturing data and trade fears dragged stocks down in late September. The S&P/TSX Composite Index ended the quarter up 3.17% (22.88% y/y).
- Seven of 11 S&P/TSX capped sub-indices recorded positive returns. Information technology was the top-performing sector during the quarter, posting a 10.83% return on the back of a 25.22% leap from Shopify Inc.
- Small-cap stocks outperformed mid- and large-cap stocks, and growth stocks outperformed their value counterparts.

U.S. Equities

- U.S. equity markets shrugged off the impeachment of President Trump to soar in the fourth quarter as fears of a recession waned and officials reported progress on Chinese trade negotiations.
- The S&P 500 rose 9.07% (31.49% y/y), the Dow rose 6.67% (25.34% y/y) and the NASDAQ was up 12.47% (36.69% y/y).
- Ten of 11 sectors in the S&P 500 produced a positive return in the quarter, with technology and health care rising the highest, respectively, at 14.40% and 14.37%. Real estate was the only sector to post a negative return in quarter, declining 0.54%.
- Small-cap U.S. stocks outperformed large- and mid-cap stocks, and U.S. growth stocks outperformed their value counterparts.

International Equities

- Major developed markets were strong in Q4, with the exception of U.K.'s FTSE 100.
- The MSCI Emerging Markets Index leapt 9.63% in Q4 (18.51% y/y), tracking developed markets on optimism over a possible breakthrough in the U.S.-China trade negotiations.
- The Shanghai Composite PR Index rose 5.00% (25.30% y/y); the Indian Nifty 50 PR Index rose 6.05% (12.05% y/y).

TD Wealth Asset Allocation Committee (WAAC) Overview

Equity markets posted remarkable 2019 returns, delivering double digit gains globally and above 20% in the U.S. and Canada. Looking ahead, we continue to be cognizant of a convergence of macroeconomic factors that may influence the performance of financial markets. While some factors remain supportive of continued economic growth, optimism should be tempered with possible risks associated with geopolitical uncertainty, the potential for central bank missteps, and trade protectionism.

Equities

We have a modest preference for U.S. equities over Canadian, as we expect Canadian economic growth to lag the U.S. However, Canada's prolonged period of equity market underperformance, and pockets of economic strength, may offer opportunities from a valuation perspective. In the U.S, we do not anticipate a near-term recession and are seeing signs of a resumption in growth. Corporate earnings growth should remain broadly positive in 2020, but at more subdued levels compared to 2019. Companies are generating positive free cash flows and are expected to continue to boost dividends and repurchase shares. Market valuations appear to be reasonable despite being at the higher end of the valuation range from a historical perspective. We maintain an overweight outlook for emerging market equities. Continued accommodation by global central banks, and progress between the U.S. and China on trade, support this view. Additionally, forward Price-to-Earnings ratios for emerging markets stocks are considerably lower than many developed markets.

Fixed Income

We maintain an overall underweight view for bonds, as the spread of expected returns between equities and fixed income reinforces our preference for equities. Yields declined throughout 2019, driven by a wave of easing and dovish central bank policies across the globe. Policy makers have become increasingly data dependent and remain committed to using accommodation to sustain the economic expansion. We expect bond yields to remain in a range near current low levels, as global growth expectations continue to be subdued and markets price in rate cuts for the coming years.

Alternative Assets

Following volatility in late 2018 and early 2019, commercial mortgage spread premiums over corporate bonds have stabilized near long-term averages and remain attractive. We have a positive view of Canadian Real Estate. Sound fundamentals across property types has allowed for year-over-year net operating income growth, particularly in assets located in transit-linked nodes in major urban areas. Despite solid gains across all asset classes this year in Global Infrastructure, the last twelve months has seen increased volatility given global macro-economic headwinds. This highlights the benefit of private infrastructure exposure for stability and the income it can provide portfolios.

Investment Performance

Description	Last Month	Last 3 Months	Year To Date	One Year	Two Years	Three Years	Four Years	Five Years	Since Inception	Inception Date
				Annualized Compound Return						
Canadian Equities	**0.46%**	**3.20%**	**22.94%**	**22.94%**	**5.89%**	**6.94%**	**10.29%**	**6.30%**	**5.39%**	**07/31/00**
S&P/TSX Composite Index CAD	0.45%	3.17%	22.88%	22.88%	5.81%	6.89%	10.27%	6.27%	5.25%	
U.S. Equities	**0.54%**	**6.73%**	**24.42%**	**24.42%**	**13.69%**	**13.60%**	**12.07%**	**13.84%**	**5.23%**	**07/31/00**
S&P 500 Net TR Index - C$	0.53%	6.67%	24.09%	24.09%	13.39%	13.31%	11.79%	13.54%	4.99%	
International Equities	**0.80%**	**5.93%**	**15.88%**	**15.88%**	**4.46%**	**8.43%**	**5.60%**	**8.17%**	**3.17%**	**07/31/00**
MSCI EAFE Net TR - C$	0.80%	5.94%	15.85%	15.85%	4.34%	8.34%	5.52%	8.08%	3.14%	
Fixed Income	**-1.23%**	**-0.89%**	**6.72%**	**6.72%**	**4.02%**	**3.49%**	**2.99%**	**3.10%**	**5.29%**	**07/31/00**
FTSE Canada Bond Universe Index~ CAD	-1.19%	-0.85%	6.87%	6.87%	4.10%	3.57%	3.09%	3.18%	5.37%	
Total Portfolio	**-0.17%**	**2.23%**	**16.27%**	**16.27%**	**6.47%**	**6.80%**	**7.55%**	**6.41%**	**5.51%**	**07/31/00**
45420 CUSTOM BENCHMARK	-0.16%	2.22%	16.17%	16.17%	6.35%	6.71%	7.50%	6.35%	5.49%	

For segregated assets total return is calculated using daily time-weighted rates of return which are linked geometrically over the period. The total return includes realized and unrealized gains and losses plus income. Returns are calculated after trading expenses but before management fees. Assets are valued using trade date accounting and accrual accounting for dividends as well as fixed income securities and all other assets that accrue interest.
Fund returns are calculated as Ending Net Asset Value per unit (NAVpu) plus distribution per unit divided by beginning NAVpu. If the since inception period is less than one year, the since inception return represents the total return for the period.