

April 27, 2018

Mr. Adam Molineux
Pension Corporation
2995 Jutland Road
Victoria, BC V8T 5J9

Dear Adam,

Re: Valuation of the Active Members of the Simon Fraser University Pension Plan for Members of the Academic Staff (SFU Faculty Plan) under the British Columbia College Pension Plan (BCCPP)

As requested, please find enclosed a valuation of the active members of the SFU Faculty Plan assuming they joined BCCPP for future service only on August 31, 2015 calculated on both the funding and the sustainable indexing bases. The aim of these valuations is to estimate the terms on which the SFU Faculty Plan members will be accepted into the BCCPP so that there is no negative impact on the existing membership¹:

1. The funding basis valuation is used to establish the impact on the Basic account and identify the lump sum, or additional basic contribution, that is required to ensure the Basic Account is not negatively affected.
2. The sustainable indexing valuation is used to establish the impact on the sustainable indexing position of the plan and identify any associated lump sum or IAA contribution adjustments that may be required.

The intended users of this report are the Trustees of the BCCPP, BC Pension Corporation, the relevant decision makers at Simon Fraser University and their advisors. The figures presented in this report are prepared only for the purpose of determining the impact on the BCCPP if the active members of the SFU Faculty Plan were to join the BCCPP. This report is not intended or necessarily suitable for other purposes.

This report should be read in conjunction with our actuarial report on the August 31, 2015 actuarial valuation of the British Columbia College Pension Plan, dated May 12, 2016 (the 2015 BCCPP report).

¹ The actual terms can only be calculated once agreement is reached that the SFU faculty plan members will join the CPP, and the actual transferring group confirmed and the effective date for their commencement in the plan is set. This is discussed later in this report.

Description of the Benefits

The benefits valued are as outlined for in Appendix A of the 2015 BCCPP report.

Data

Data on the SFU Faculty Plan members as of August 31, 2015 was provided to us via the Pension Corporation. We used and relied on this data as provided, except as noted below.

1,213 members in total were included with a status of either active (1,095 members), leave of absence (113 members) or disabled (5 members). For the 1,095 active members, we excluded 2 duplicate records and also excluded 23 members who had reached age 71 by December 31, 2014 i.e. the end of the year prior to the valuation date. We treated the remaining 1,070 active members in the same way as outlined in Appendix B of the 2015 BCCPP report. Gender code was missing for 1 of these active members, and we assumed this member is male. Salary details were inappropriate (missing or very low) for 19 active members. We assumed that these 19 members had the same average earnings as for actives in the BCCPP in the same age-sex category.

For the 113 members listed as on a leave of absence, we excluded 2 duplicate records, and assumed that the remaining 111 members would return to active service as of the valuation date and accrue future service, i.e. we treated the members on a leave of absence in the same way as the active members.

The liability for the 5 disabled members was calculated assuming those members would collect a deferred pension at age 63 with service projected to their retirement date.

A summary of the data is included in Appendix 2 of this report.

Method and Assumptions – Basic Account

As with latest BCCPP valuation, the entry age funding method was used. Under the entry age method, the long-term level contribution rate, or entry-age normal cost (EANC) contribution rate, is calculated that is sufficient to fully fund benefits for future new entrants over their working lifetime and the funded position assuming the EANC is paid in the future is calculated to establish whether there is a surplus or an unfunded liability.

Our calculations assume that the SFU Faculty Plan members who join BCCPP will pay the current BCCPP EANC. However, as they are joining the plan at an older age than the average new entrant, the present value of future contributions at the EANC rate over their projected working life is lower than the present value of the benefits that they will earn over the corresponding period. As a result, an unfunded liability arises even though no past service is being credited. The reason for this is as follows: Under the entry age method a level contribution (as a percentage of pay) is assumed to be paid over a new

entrant's working life, while the actual cost of pension accrual increases with age. Thus, while the accumulated contributions are sufficient to meet the total cost of accrual over their working life, new entrants initially pay more than the cost of the pension accruing while later they pay less than the cost of the pension accruing. Members who join at an older age than the average new entrant don't make the expected "over payments" in the early years, while paying less than the cost of the pension accruing in the later years, resulting in an unfunded liability.

More details on the method and the assumptions for both bases are included in Appendix B of the 2015 BCCPP report. A summary of the key assumptions is included in Appendix 1 of this report.

Valuation of Unfunded Liability – Basic Account

The Basic Account unfunded liability as of the August 31, 2015 valuation date is equal to the liabilities for future service less the value of expected future contributions in respect of the transferring members, calculated on the entry age method.

The Basic unfunded liability can be paid off by means of a one-off lump sum payment or by means of an additional Basic contribution levied on SFU Faculty members' salaries that is equal in value to the required lump sum. Two adjustments are required when calculating the required lump sum. Firstly, the Basic account has a surplus so in order for the funded position of the plan to not be affected by the SFU Faculty members joining, an additional amount is required to keep the funded ratio unchanged. Secondly, the amount needed must take into account the difference between the smoothed value of assets and the market value of assets. In this calculation we have calculated the adjustment based on the asset smoothing applied in the 2015 CPP valuation, as described in Appendix B of the 2015 BCCPP report.

The effect of this approach is that the plan's Basic account financial status is not affected (positively or negatively) by the addition of the SFU members. Thus, if the SFU members had joined the plan at the August 31, 2015 valuation date, and the calculated assets had been transferred on August 31, 2015, the funded ratio of basic account would not have changed from that shown in the 2015 BCCPP report.

Impact of Future SFU Faculty new entrants

Under the entry age methodology, the normal cost of future benefits is calculated based on the age and gender profile of recent new entrants to the plan, and is sensitive to this profile. The 1,186 SFU Faculty members valued for this costing would increase the BCCPP active population as of August 31, 2015 by almost 11%. If future SFU Faculty new entrants represent a similar proportion of the overall future new entrants, it is possible that there will be an impact on the BCCPP entry age normal cost if their age and gender profile is sufficiently different from the age and gender profile of the remainder of the new entrants. It is not possible for us to anticipate if or how the SFU Faculty new entrant profile will differ from

that of the rest of the plan and hence we cannot anticipate how the SFU Faculty joining the plan will affect future entry age normal costs. Any impact will be reflected in future valuations.

Summary of Basic Account Results

The results are shown in the table below.

Results – Entry-age Normal Cost

(\$000's) - August 31, 2015	Basic Account Funding Basis non-indexed
Liabilities	
Actuarial present values for:	
▪ Active and LOA members	142,133
▪ Members on LTD	312
▪ Future expenses	4,762
Total Liabilities	147,207
Assets	
Actuarial present values of:	
▪ Future contributions at entry-age rates	131,988
Sub-total of Future Assets	131,988
Initial Deficit	15,219
Additional Basic Account requirement to maintain the 101.56% funded ratio	2,300
Smoothed Value Required	17,519
Asset Smoothing Adjustment	1,524
Market Value Required	19,043

The total market value required for the Basic Account as of August 31, 2015 is \$19,043,000.

Basic contribution - Amortization in lieu of lump sum

We have also calculated the additional Basic account contribution if the Basic lump sum amount was amortized over a 15 year period to be 1.27% of salary payable for 15 years for all SFU Faculty Plan members. The results are shown in the table below.

(\$000's) - August 31, 2015	Basic Account Funding Basis non-indexed
Market Value required	19,043
Total SFU payroll	121,073
15 year amortization factor	12.4015
Additional Basic contribution required	1.27%

Basic contributions are currently being paid at 16.88% of pay, compared to the EANC of 16.63%. This 0.25% of pay excess above the EANC should not be offset against the above 1.27% requirement. In other words, the total SFU Faculty Basic contribution requirement would be 18.15% of pay (16.88%+1.27%).

Method and Assumptions – Sustainable Indexing

In practice, the required basic account and IAA contributions will be paid in respect of members. As described in the 2015 BCCPP valuation report, the sustainable indexing limit is set such that the long term component of these contributions (the Basic entry age normal cost and the fixed IAA contributions) is close to but not higher than the required entry age method contributions (with the amortization of the funded position over infinity so as to ensure that the required rate is constant over time) after adjusting the funded position for the Basic amortization. This is described in more detail on page 16 and 17 of the 2015 BCCPP report, with the results and calculations shown in Section V of the report.

Further adjustments will be required to allow for the actual transfer date being after August 31, 2015 valuation date, and these are discussed in the “Adjustments to Transfer Amount” section below.

We first calculated the present value of future liabilities for the SFU Faculty Plan members, based on the BCCPP benefits, and using the methods and assumptions used for the August 31, 2015 BCCPP valuation and the data as provided for the SFU Faculty Plan members.

We then calculated the present value of future member and employer contributions at the entry-age normal cost rates for the BCCPP, as established at the August 31, 2015, namely:

- An entry-age normal cost based on the sustainable indexing target of 2.07% of 19.61% of salary, and
- An entry-age normal cost for the Basic account non-indexed benefits of 16.63% of salary.

In addition, for the sustainable indexing valuation, we included an amount (0.16% of salary) to amortize the total unfunded liability under the Sustainable Indexing valuation over infinity, as per the August 31, 2015 sustainable indexing valuation.

(\$000's) - August 31, 2015	Sustainable Indexing Basis Target indexing = 2.07%
Liabilities	
Actuarial present values for:	
Active and LOA members	162,531
Members on LTD	356
Future expenses	4,632
Total Liabilities	167,519
Assets	
Actuarial present values of:	
Future contributions at entry-age rates	151,390
Amortization of 0.16% unfunded liability over infinity	6,251
Sub-total of Future Assets	157,640
Initial Deficit	9,879
Smoothed Value Required	9,879
Asset Smoothing Adjustment	520
Market Value Required	10,399

The amount required under the sustainable indexing valuation is lower than the amount required under the non-indexed basic account valuation, mainly because the sustainable indexing valuation is in a deficit position and requires an amortization of 0.16% of pay over infinity. The present value of this amortization for the SFU members is treated as an asset in the sustainable indexing valuation. The above results show that no additional payments are required into the IAA when the SFU member's join.

If the Basic required amount of \$19,043,000 is paid in a lump sum, then the sustainable indexed position for the SFU Faculty members will be overfunded, since the lump sum of \$10,399,000 required under the sustainable indexing basis is lower. It is not possible to adjust for this using a lump sum transfer, but a lower IAA contribution would be acceptable. This reduction in the IAA contributions would be 0.57% of pay over 15 years.

If the Basic account required amount is amortized, the additional contribution to the Basic account to fund the lump sum needs to be 1.27% as shown on the previous page. In this case, again, the IAA contribution could be 0.57% of pay lower than the current BCCPP IAA contribution for 15 years.

Adjustment to Transfer Amount and Resulting Amortization

As noted above, this initial estimate has been calculated as of August 31, 2015. Given that the actual date that the SFU Faculty members join BCCPP and that date of payment of the transfer amount will be later than that, the actual transfer amount or amortization due in lieu should be recalculated as of the date of joining and interest and contribution adjustments will be required in addition. These adjustments are summarized in Appendix 3.

Recalculation

This valuation is valid until August 31, 2018. If the transfer is to be made after that date, then a new valuation may be required before the transfer can proceed.

Opinion

In our opinion,

- (a) the membership data on which the valuation is based are sufficient and reliable for the purposes of the valuation,
- (b) the assumptions are appropriate for the purposes of the valuation, and
- (c) the methods employed in the valuation are appropriate for the purposes of the valuation.

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

We are not aware of any subsequent events that would have a material impact on the valuation results presented herein. Emerging experience, differing from the assumptions, will result in gains or losses which will be revealed in future valuations.

Respectfully submitted,



Richard Border



Catherine Robertson

Appendix 1

Summary of Key Actuarial Assumptions

	Funding Valuation	Sustainable Indexing Valuation
Annual Investment Return	6.25%	6.50%
Annual Salary Increase	3.50% plus seniority	3.25% plus seniority
Annual Indexing	0% for basic costs	2.50% for fully indexed costs Sustainable level of indexing calculated as valuation output
Mortality rates	70% for males and 60% for females below age 80, 100% for males and 90% for females age 80 and over of the rates in 2014 Public Sector Mortality Table (CPM2014Publ), projected using CPM Improvement Scale B (CPM-B).	

Appendix 2 - Data Summary as at August 31, 2015

Active Member Data

Age group ¹	Active members August 31, 2015	
	Number	Average annual earnings ² \$
Males – average age 51.9		
25-29	5	70,102
30-34	32	102,217
35-39	53	105,514
40-44	87	109,391
45-49	107	115,596
50-54	115	120,609
55-59	91	128,754
60-64	87	136,724
65-69	76	125,403
70 & over	19	122,322
Total	672	119,696
Females – average age 49.7		
25-29	3	41,329
30-34	18	76,828
35-39	49	89,383
40-44	65	96,993
45-49	61	105,527
50-54	59	108,406
55-59	66	110,538
60-64	48	116,298
65-69	23	123,150
70 & over	6	92,198
Total	398	103,738
Total Males and Females average age 51.1)	1,070	113,760

¹ Age nearest birthday at August 31, 2015.

² Reflects data provided i.e. actual earnings in 2015 for those employed all year and annualized for others. Missing or very low earnings were replaced by the average earnings for members with earnings in the same age/gender category under the BCCPP.

Members on Leave of Absence

	Number	Average Age	Average annual earnings
Males	65	53.4	120,771
Females	46	50.7	107,640
Total	111	52.3	115,329

Members on Long-Term Disability

	Number	Average Age	Average annual earnings
Total Males and Females	5	59.6	117,366

Appendix 3 – Additional Information on Transfer Calculation Adjustments

The following dates are relevant:

- Acceptance Date: The date on which the decision in principal to accept the transfer of the SFU Faculty members is made by the College Pension Board of Trustee.
- SFU Faculty Plan Entry Date: The date from which SFU Faculty members will join the BCCPP and begin to accrue benefits for future service.
- Calculation Date: The effective date for the final calculation report. This date will be after the Acceptance Date and before the Transfer Date and should be set by agreement between the appropriate representative for the SFU Faculty Plan, Eckler and the Pension Corporation.
- Market Return Date: A date, to be finally agreed on and dependant on the Acceptance Date. This will be the most current quarter end for which BCI investment returns for the College Pension plan are available prior to the Calculation Date.
- Transfer Date: The date, after the Calculation Date, on which the assets will be transferred to the BCCPP. The Transfer Date needs to allow a sufficient period of time for the necessary calculations and report to be prepared and final agreement reached, so that the required amounts can be transferred on this date.

We propose that the following approach is then employed for calculating the transfer amount in the final calculation report.

Members Eligible to Join the BCCPP at the SFU Faculty Plan Entry Date

We will calculate the transfer amount as at the SFU Faculty Plan Entry Date for those members who are eligible to join the BCCPP at that date, as set out in this report.

Interest will then be added as follows. Interest from the SFU Faculty Plan Entry Date to the Market Return Date will be added at the actual market rate, net of investment fees, earned on the College Pension Plan assets over that period. Interest from the Market Return Date to the Transfer Date will be added at the best estimate nominal going concern funding valuation discount rate from the BCCPP 2015 Valuation, i.e. at 6.5% per annum.

In addition, an amount reflecting the contributions that would have been paid had these members been members of the BCCPP from the SFU Faculty Plan Entry Date to the Transfer Date, plus interest is required. Interest will first be added at the rate earned on the assets of the BCCPP from the date the

contribution would have been paid had they been members of the MPP to the Market Return Date. We understand that only quarterly returns are available, hence we propose that the relevant quarterly rates should be applied. Thereafter interest will be added each quarter at the relevant quarterly rate. Interest will then be added from the Market Return Date to the Transfer Date at 6.5% per annum. However, for any monthly contributions due to BCCPP and included in the final transfer amount within a year of the due date, no interest will be added.

The interest will be calculated as set out below in the section describing the calculation for members who were not active at the Valuation Date.

Amortization Option

The amortization option will be recalculated as of the SFU Faculty Plan Entry Date, based on the transfer amount calculated at that date. The amounts then due will be the amortization contributions plus the contributions due to the BCCPP from the SFU Faculty Plan Entry Date. Interest on these contributions will be added as described for the interest on contributions in the “Members Eligible to Join the BCCPP at the SFU Faculty Plan Entry Date” section.

Members who were not eligible at the SFU Faculty Plan Entry Date, but eligible at the Calculation Date

The transfer in respect of these members will be the contributions that would have been paid had they been members of the BCCPP from they become eligible to join, plus interest to the Transfer Date.

Interest will be added as described for the interest on contributions in the Members Eligible to Join the BCCPP at the SFU Faculty Plan Entry Date” section.

Member Changes after the Calculation Date

No adjustment to the transfer amount will be made for terminations or new members joining after the Calculation Date, but before the Transfer Date. It is clearly in all parties’ interests that the time between the Calculation Date and the Transfer Date be kept as short as possible, but we will require a suitable length of time to do the calculations and prepare our report and allow the actuary to SFU to review the same.

Final Transfer Amount

As can be seen, the final transfer amount will only be known once the BCCPP Board agrees to accept the SFU Faculty members into the plan, but the information that has been provided to date should be sufficient for the SFU actuary to estimate a ball park transfer amount after they make assumptions with respect to the number of members who will transfer and estimate the contribution requirements set out above.

Valuation Date

As noted, our valuation is valid until August 31, 2018. If the SFU Faculty Plan Entry Date is significantly after this date, it should not change our proposed methodology for calculating the transfer amount in the final calculation report, although this will be subject to confirmation and allowance for any significant changes which arise in the funded status of the BCCPP and required contributions as a result of the August 31, 2018 valuation.