MORNEAU SHEPELL

The City of Saint John
Shared Risk Plan

Actuarial Valuation Report as at January 1, 2017

Report prepared September 2017

Registration Number: Canada Revenue Agency #0269209
NB Superintendent of Pensions #0269209

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Introduction

The City of Saint John Pension Plan ("Former CSJ Plan") was converted to the City of Saint John Shared Risk Plan ("CSJ SRP Plan") effective January 1, 2013.

This report was prepared for the CSJ SRP Plan Board of Trustees ("Trustees"), and the New Brunswick Superintendent of Pensions ("Superintendent") for the following purposes:

- to document the results of the funding policy valuation, as required under subsection 100.61(1) of the New Brunswick *Pension Benefits Act* ("PBA") and subsections 14(5) to 14(7) of Regulation 2012-75, and provide the related actuarial opinion;
- to document the results of the risk management procedures as required under paragraph 100.7(1)(e) of the PBA;
- to document the results of a hypothetical wind-up valuation of the CSJ SRP Plan as required under the Canadian Institute of Actuaries Standards of Practice, and provide the related actuarial opinion; and

The Board of Trustees is also seeking the approval of the Superintendent for the following items, as required under the PBA and Regulation:

- approval of the generational mortality table used in the funding policy valuation as required under sub-paragraph 14(7)(c)(ii) of Regulation 2012-75;
- approval of the asset liability model used, as described in Section 2, including the stochastic projection assumptions found under Appendix C, as required under subsection 15(1) of Regulation 2012-75; and
- approval of the economic assumptions used in the asset liability model, as described under Appendix C, as required under subsection 15(3) of Regulation 2012-75.

The Trustees for the CSJ SRP Plan retained the services of Morneau Shepell Ltd ("Morneau Shepell") to prepare this report.

The last actuarial valuation report prepared for the CSJ SRP Plan and filed with the Superintendent and the Canada Revenue Agency ("CRA") was performed as at January 1, 2016, in accordance with the requirements of subsection 100.61(1) of the PBA.

The next actuarial valuation report for the CSJ SRP Plan will be due no later than one year following the effective date of this report.

The recommendations and opinions are given exclusively from a financial viewpoint. This valuation report does not constitute a legal opinion on the rights and duties of the Trustees or the members of the plan over the pension fund.

Actuarial valuation results are only estimates. Actuarial valuations are performed based on assumptions and methods that are in accordance with sound actuarial principles. Emerging experience differing from these assumptions will result in gains or losses, which may affect future open group funded ratios of the Plan and future risk management procedure results, which in turn will impact the types and timing of any actions to be

taken by the Trustees in accordance with the Funding Policy. These gains and losses will be revealed in future actuarial valuations.

We are not aware of any subsequent event, other than those identified in this report, which would have a material impact on the results of the valuation.

The undersigned is available to provide supplementary information and explanation as appropriate, concerning this report.

Respectfully submitted,

Yves Plourde, FSA, FCIA

September 22, 2017

Date

This report has been peer reviewed by Daniel Dine, FSA, FCIA, CERA.

Section 1 – Funding Policy Valuation

A funding policy valuation is required annually under subsection 100.61(1) of the PBA and subsections 14(5) to 14(7) of Regulation 2012-75. The results of the funding policy valuation of the CSJ SRP Plan as at January 1, 2017 are found below.

The funding policy valuation results presented in this section are based on asset information found in Appendix A, membership data found in Appendix B, plan provisions summarized in Appendix D, and the Funding Policy summarized in Appendix E of the report. The methods and assumptions used in the funding policy valuation are described later in this section.

Funding Policy Valuation Funded Status

The funding policy valuation funded status of the CSJ SRP Plan is determined by comparing the fair market value of the assets to the funding policy actuarial liabilities. The funding policy actuarial liabilities are based on the benefits earned up to the valuation date assuming the CSJ SRP Plan continues indefinitely.

The funding policy valuation funded status of the CSJ SRP Plan as at January 1, 2017, along with the results in the previous valuation as at January 1, 2016, are found below:

Table 1.1 – Funding Policy Valuation Funded Status

	January 1, 2017	January 1, 2016
Market Value of Assets	$M	$M
• Fair market value of assets (including receivables / payables)	$549.3	$507.6
Funding Policy Actuarial Liabilities		
• Active and disabled members	220.8	217.3
• Terminated deferred vested members	1.4	0.7
• Retired members and survivors	391.8	377.2
• Outstanding refunds and withholding amounts	0.3	1.0
• Total funding policy valuation actuarial liabilities	$614.3	$596.2
Funding policy valuation excess (unfunded liability)	($65.0)	($88.6)
Termination value funded ratio [calculated in accordance with Reg. 14(6)(e)]	89.4%	85.1%

The termination value funded ratio is used in the calculation of the "termination value" of any individual's pension benefits at termination of employment, death, marriage breakdown, or retirement, as the case may be, in accordance with the terms of the CSJ SRP Plan and subsection 18(1) of Regulation 2012-75. It is calculated in accordance with paragraph 14(6)(e) of Regulation 2012-75.

Funding Policy Valuation Normal Cost and Excess Contributions

The table below provides the funding policy valuation normal cost, being the value of the pension benefits being earned in the twelve-month period after the valuation date. It compares the funding policy valuation normal cost to the level of member and employer contributions in order to determine the level of contributions being made to the CSJ SRP Plan in excess of the funding policy valuation normal cost. Results for the calendar year 2017 are presented below, along with the results for 2016 found in the previous valuation as at January 1, 2016.

Table 1.2 – Funding Policy Valuation Normal Cost and Excess Contributions

	Year Following January 1, 2017		Year Following January 1, 2016	
	$M	% of payroll	$M	% of payroll
A. Member initial contriubtions	$6.5	10.4%	$6.4	10.4%
B. City initial contributions	8.2	13.1%	8.1	13.2%
C. City temporary contributions	10.7	17.0%	10.5	17.0%
D. Funding policy valuation normal cost	9.3	14.8%	9.1	14.8%
E. Excess contributions (A. + B. +C. – D.)	16.1	25.7%	15.9	25.8%
Estimated payroll for following year	$62.8		$61.9	

Determination of 15-Year Open Group Funded Ratio

The table below provides the 15-year open group funded ratio as calculated in accordance with the requirements of paragraph 14(6)(f) of Regulation 2012-75. This ratio is used extensively in the Funding Policy to determine the actions to be undertaken by the Trustees under the funding deficit recovery plan and the funding excess utilization plan. The 15-year open group funded ratio is calculated as follows:

Table 1.3 – 15-Year Open Group Funded Ratio

	January 1, 2017	January 1, 2016
	$M	$M
A. Market value of assets (including receivables / payables)	$549.3	$507.6
B. Present value of excess contributions over next 15 years [calculated in accordance with Reg. 14(6)(c)]	177.7	183.4
C. Funding policy valuation actuarial liabilities	614.3	596.2
D. 15-year open group funded ratio [(A. + B.) / C.]	118.3%	115.9%

Reconciliation of Funding Policy Valuation Funded Status with Previous Valuation

The table below describes the change in the Plan's funded status between the last funding policy valuation as at January 1, 2016 and this funding policy valuation as at January 1, 2017:

Table 1.4 – Reconciliation of Funded Status

	$M	$M
Funding policy valuation excess (unfunded liability) as at January 1, 2016		($88.6)
Expected changes in funded status		
• Interest on funding excess (unfunded liability)	(4.0)	
• Contributions in excess of normal cost	16.2	
• Cost of CPI indexing awarded as at January 1, 2017 (Steps 1 and 2)	(6.6)	
• Cost of AWI indexing awarded as at January 1, 2017 (Step 3)	(1.5)	
• Cost of change to unreduced early retirement rules for 2013 pension accrual as at January 1, 2017 (Step 4)	(4.7)	
Total		($0.6)
Expected funding policy valuation excess (unfunded liability) as at January 1, 2017		($89.2)
Actuarial gains (losses) due to the following factors:		
• Investment return on actuarial value of assets	22.5	
• Retirements	0.9	
• Mortality	0.1	
• Terminations	0.3	
• Other factors	0.4	
Total		$24.2
Funding policy valuation excess (unfunded liability) as at January 1, 2017		($65.0)

The references to Steps 1, 2, 3 and 4 in the above table are related to the corresponding steps found in the Funding Excess Utilization Plan under the Funding Policy for the Plan.

Reconciliation of Total Normal Cost

The factors contributing to the change in the total normal cost from the last funding policy valuation as at January 1, 2016 and this funding policy valuation as at January 1, 2017 are shown below:

Table 1.5 – Reconciliation of Total Normal Cost

	% of payroll
Total normal cost as at January 1, 2016:	14.8 %
Impact of changes in demographics:	0.0 %
Total normal cost as at January 1, 2017 (see Table 1.2 D.):	14.8 %

Sensitivity Analysis on the Funding Policy Basis

The Standards of Practice of the Canadian Institute of Actuaries require valuation reports to disclose the sensitivity of the liabilities to changes in the discount rate assumption. The table below illustrates the effect of 1% decrease in the discount rate on the funding policy actuarial liabilities. With the exception of the discount rate, all other assumptions and methods used for this valuation were maintained.

Table 1.6 – Sensitivity of Actuarial Liabilities on the Funding Policy Basis

	January 1, 2017	Discount rate 1% lower
	$M	$M
Actuarial liabilities		
• Active and disabled members	$220.8	$264.7
• Terminated deferred vested members	1.4	1.8
• Retired members and survivors	391.8	434.6
• Outstanding refunds and withholding amounts	0.3	0.3
• Total	$614.3	$701.4
Increase in actuarial liabilities		$87.1

Sensitivity Analysis on the Funding Policy Total Normal Cost

The table below illustrates the effect on the total normal cost of using a discount rate 1% lower than the one used for the funding policy valuation. All other assumptions and methods, as used in this valuation, were maintained.

Table 1.7 – Sensitivity of Funding Policy Total Normal Cost

	As at January 1, 2017		Discount rate 1% lower	
	M$	% of payroll	M$	% of payroll
Total normal cost	$9.3	14.8%	$11.3	18.2%
Increase in total normal cost			$2.0	3.4%

Funding Policy Actuarial Methods

Asset Valuation Method

The assets used under the funding policy valuation are equal to the fair market value of the assets. This is a requirement of paragraph 14(6)(d) of Regulation 2012-75.

Actuarial Cost Method

The funding policy valuation actuarial liabilities and normal cost were calculated using the accrued benefit (or unit credit) actuarial cost method in accordance with the requirement of paragraph 14(7)(a) of Regulation 2012-75.

The funding policy valuation actuarial liabilities are equal to the actuarial present value of benefits earned by members for services prior to the valuation date, taking into account the actuarial assumptions as indicated hereafter. For greater certainty, it does not take into account the impact of any future salary increases, and the impact of any future increases in accrued pensions due to cost-of-living adjustments as may be granted from time to time by the Trustees in accordance with the plan documents and the Funding Policy.

The funding policy valuation normal cost is equal to the actuarial present value of benefits expected to be earned by members in the year following the valuation date. A salary increase estimate has been made to calculate the estimated normal cost and estimated member and employer contributions for the year following the valuation date.

The disabled members are valued as active members; however, we assumed that there would be no contributions from them or from the City on their behalf.

The ratio of the total normal cost to the covered payroll for the period will tend to stabilize over time if the demographic characteristics of the active and disabled members remain stable. All other things being equal, an increase in the average age of the active and disabled members will result in an increase in this ratio.

For valuation purposes, to determine eligibility for benefits and for any other use, the age used is the age on the date of the nearest birthday.

Funding Policy Actuarial Assumptions

The main actuarial assumptions employed for the funding policy actuarial valuation are summarized in the following table. Emerging experience differing from these assumptions will result in gains or losses, which will be revealed in future funding policy actuarial valuations. Experience gains and losses emerging in future funding policy actuarial valuations will impact the open group funded ratio of the CSJ SRP Plan, which in turn will impact the types and timing of any actions to be taken by the Trustees in accordance with the Funding Policy. All rates and percentages are annualized unless otherwise noted.

Table 1.8 – Funding Policy Actuarial Valuation Assumptions

	January 1, 2017							
Discount rate	4.50% per annum							
Salary increase for year following valuation (for normal cost purposes only, and inclusive of promotional increases)	3.00%							
Mortality	70% CPM Priv 2014, 30% CPM Publ 2014 weighted table, projected with improvement scale B with adjustment factors of 105% for males and 102% for females							
Retirement *(see note)*	Regular Members						Police and Fire	
		Age at conversion						
	Retirement Age	Under 25*	25-34	35-44	45-54	55+	Retirement Age	All ages
	55	5%	5%	5%	5%	5%	50	5%
	56	5%	5%	5%	5%	9%	51	5%
	57	5%	5%	5%	9%	9%	52	5%
	58	5%	5%	9%	9%	9%	53	5%
	59	5%	9%	9%	9%	9%	54	5%
	60	9%	9%	9%	9%	9%	55	9%
	61	9%	9%	9%	9%	30%	56	9%
	62	9%	9%	9%	30%	5%	57	9%
	63	9%	9%	30%	5%	5%	58	9%
	64	9%	30%	5%	5%	5%	59	9%
	65	30%	5%	5%	5%	5%	60	30%
Termination of employment (Sample rates of termination other than by death or retirement)	Age		Male		Female			
	22		9.0%		13.1%			
	27		5.3%		10.9%			
	32		2.6%		7.1%			
	37		1.4%		4.5%			
	42		0.9%		2.6%			
	47		0.5%		0.8%			
	52+		0.0%		0.0%			

Table 1.8 – Funding Policy Actuarial Valuation Assumptions (Cont.)

Disability	None explicitly assumed Current disabled members included in normal cost (no contributions assumed) – resulting in an increase in normal cost of 0.45% of payroll at valuation date
Proportion with a spouse or common-law partner at retirement	85%
Spousal age difference	Males 3 years older than females
Expenses	Implicit in discount rate

** or new member after conversion*

Note: For the retirement assumptions above, a member is expected to follow the retirement assumptions which are dependent on his or her age at the time of conversion. If a member is older than the earliest retirement age in our table at the valuation date, the member is assumed to retire the following year with a probability of retirement equal to the sum of all probabilities assigned for that age and ages younger. All other probabilities at older future ages remain the same.

Additional assumptions are required to determine the level of future cash flows to and from the CSJ SRP Plan, such as member and employer contributions, normal costs, benefit payments and expenses. These cash flows are calculated on a deterministic basis for each year following the valuation date for a period of 20 years, and allows the determination of the funding policy actuarial liability and assets at each future date, as well as the determination of the present value of 15-year excess contributions in accordance with paragraph 14(6)(c) of Regulation 2012-75. Furthermore, all this information is used in the stochastic analysis required under the risk management procedures for the CSJ SRP Plan.

Table 1.9 – Additional Funding Policy Actuarial Valuation Assumptions for Purpose of Calculating Future Year Cash Flows and Actuarial Liability

	January 1, 2017		
New entrants	Each active member is replaced at termination, death or retirement by a new entrant with no net increase in the active plan membership		
Distribution of new entrants and salary at entry	**Regular Members**		
	Age	**Distribution**	**Average Salary at Entry**
	27	33 ⅓%	$49,500
	34	33 ⅓%	
	41	33 ⅓%	
	25% female / 75% male		
	Police and Fire		
	Age	**Distribution**	**Average Salary at Entry**
	23	33 ⅓%	$76,500
	29	33 ⅓%	
	35	33 ⅓%	
	20% female / 80% male		
Inflation	2.25% per annum		
Salary increases	3.00% per annum		

Rationale for Material Actuarial Assumptions

The assumptions have been reviewed in light of current economic and demographic conditions.

Inflation

Given the historical increases in consumer prices in Canada, the rates expected by the market, the portfolio managers' expectation, the Bank of Canada policy and the long-term forecasts of the Conference Board of Canada, Morneau Shepell believes that the expected long-term rate of inflation should be between 2.00% and 2.50%.

Consistent with this range, we have used an inflation assumption of 2.25% per annum.

Discount Rate Development

The elements considered in the development of the discount rate assumption for purposes of the funding policy valuation are summarized in the table below.

Table 1.10 – Development of Funding Policy Valuation Discount Rate

	%
Expected long-term nominal return based on the results of our stochastic analysis (using long-term target asset mix, and including the impact of rebalancing and diversification)	6.3%
Value added for active management (not exceeding the additional fees paid for active management over passive management)	0.3%
Assumed margin for adverse deviation (originally set to achieve a high probability of exceeding the discount rate over the next 20 years)	(1.6%)
Expected expenses paid from the fund	(0.5%)
Discount rate	4.5%

The expected long-term nominal return by asset class is provided in Appendix C. The target asset mix reflects changes to the SIPG up to and including the changes that were adopted effective August 23, 2017 by the Board of Trustees.

Expenses Paid From the Fund

The allowance for investment and administrative expenses to be paid from the fund as built into the discount rate is 0.50% of assets on a long-term basis. Although the recent level of expenses were higher due to the plan conversion and various related implementation activities, it has now come down to about 0.50% of assets as those activities have ended and the asset base has increased.

Rate of Salary Increase

We assumed general salary increases of 3.0% per year for the year following January 1, 2017, and on a long term basis. This rate is based on assumed inflation of 2.25% per year, and an additional 0.75% on account of productivity and general merit and promotion increases, considering current economic and financial market conditions.

Mortality

In order to take into account the improvements in life expectancy recently substantiated by the Canadian Institute of Actuaries in its report on Canadian Pensioners Mortality (published on February 13, 2014), we used 70% of the CPM-2014Priv Mortality Table and 30% of the CPM-2014Publ Mortality Table, and the CPM-B Improvement Scale, which varies by gender, age and calendar year. We believe that the use of a combination of the private and public tables above better reflect the nature of existing occupation types at the Employer compared to using solely the public sector table. Adjustment factors of 105% and 102% for males and females, respectively, were also applied to the mortality table to take into account the mortality experience in New Brunswick. This assumption remains unchanged from the previous valuation.

The mortality rates described above result in the following life expectancies for females and males.

Table 1.11 - Life Expectancy for Females and Males

Females	Life expectancy by Age in Year...				
Age	2017	2022	2027	2032	2037
55	33.8	34.1	34.3	34.6	34.8
60	29.0	29.2	29.5	29.7	30.0
65	24.3	24.5	24.8	25.0	25.2
70	19.7	20.0	20.2	20.4	20.6
75	15.5	15.7	15.9	16.1	16.3
80	11.5	11.7	11.9	12.0	12.2
Males	**Life expectancy by Age in Year...**				
Age	2017	2022	2027	2032	2037
55	31.1	31.4	31.7	32.0	32.3
60	26.5	26.8	27.1	27.3	27.6
65	22.0	22.3	22.6	22.8	23.1
70	17.6	17.9	18.2	18.4	18.6
75	13.5	13.8	14.1	14.2	14.4
80	9.9	10.1	10.3	10.5	10.6

We will continue to monitor this assumption for reasonableness.

Termination

We have used the same termination rates as used in the previous valuation. We will continue to monitor this assumption for reasonableness.

Retirement

Given the changing early retirement subsidies for service after the Conversion Date, we estimate that plan members will slowly start to delay retirement as we move away from the Conversion Date, with a more significant impact for regular members (as opposed to police and fire). As a result, retirement assumptions adopted at Conversion Date that vary depending on the member's age at conversion for regular members, and an ultimate retirement assumption for new members after conversion. A younger regular member at the valuation date will be expected to retire later on average than an older regular member at the same date. We kept only one set of retirement assumptions for police and fire members.

Opinion on Funding Policy Valuation

In my opinion, for the purposes of the funding policy valuation section of the report:

- The membership data on which the valuation is based are sufficient and reliable for the purposes of the valuation.
- The assumptions are appropriate for the purposes of the valuation.
- The methods employed in the valuation are appropriate for the purposes of the valuation.

This funding policy valuation report has been prepared, and my opinions given, in accordance with accepted actuarial practice in Canada.

The assumptions used under the funding policy valuation of this report were reasonable and consistent with the objectives of the CSJ SRP Plan at the time this actuarial valuation report was prepared.

Respectfully submitted,

Yves Plourde, FSA, FCIA

September 22, 2017

Date

Section 2 – Risk Management Goals and Procedures

Meeting Risk Management Goals

The CSJ SRP Plan was designed to achieve or exceed the risk management goals prescribed under the PBA and Regulation 2012-75. Certain procedures were developed to test whether these goals can be achieved given the contribution rules and benefits defined in the CSJ SRP Plan. These goals and procedures are described separately below, along with the results of the stochastic analysis that are relevant under the PBA as at January 1, 2017.

Risk Management Goals

The primary risk management goal is to achieve a 97.5% probability that base benefits will not be reduced over the 20 years following the valuation.

The goal is measured by taking into account the following funding management plans:

1. the funding deficit recovery plan except for reduction in past or future base benefits, and
2. the funding excess utilization plan excluding permanent benefit changes.

The funding deficit recovery plan and the funding excess utilization plan are described in Sections V and VI of the Funding Policy, respectively.

There are two secondary risk management goals under the PBA. These are:

- On average provide contingent indexing on base benefits of active members that are in excess of 75% of the Consumer Price Index (CPI) over the next 20 years, and provide contingent indexing on base benefits of retirees and deferred vested terminated members that are in excess of 75% of the average Pre-Conversion Indexation over the next 20 years.
- On average be expected to at least provide 75% of the value of the ancillary benefits described in the plan documents at conversion over the next 20 years.

For the purposes of meeting these goals, base benefits include the accrual of extra service of members and any contingent indexing provided based on the financial performance represented by each scenario tested.

If as a result, through the testing process, a scenario allows for indexing in a given future year, then this contingent indexing amount becomes part of the base benefits that is to be protected. In other words, the base benefit is dynamically adjusted based on the stochastic results for each economic scenario tested.

Risk Management Procedures

The risk management goals are measured using an asset liability model with future economic scenarios developed using a stochastic process.

The model was run with 2,000 alternative economic scenarios over 20 years. This exceeds the minimum requirements under the PBA of 1,000 economic scenarios.

For each of these scenarios and for each year, the financial position of the CSJ SRP Plan is measured. For each of these measurements, a decision consistent with the funding deficit recovery plan or the funding excess utilization plan, as applicable, is modeled with the exceptions noted under the goals above. When modeling the funding deficit recovery plan actions over the 20-year period of each of the 2,000 economic scenarios, each of the four steps identified in the funding deficit recovery plan under Section V of the Funding Policy is implemented in sequence until such time as the open group funded ratio of the plan reaches 100% or higher. A "past benefit reduction trial" is recorded (for purposes of the primary risk management goal calculation) when step 4 of the funding deficit recovery plan found in Section V of the Funding Policy is triggered (i.e. a reduction in past base benefits) at any point in the 20-year period of an economic scenario. The primary risk management measure is therefore the proportion of those 2,000 scenarios that do not lead to a "past benefit reduction trial" over a 20-year period. In order to pass the primary risk management goal, at least 1,950 of those 2,000 scenarios must not trigger a "past benefit reduction trial" as described above at any point over the 20-year period.

The asset liability model using a stochastic process requires that a number of important modeling assumptions be made. The main assumptions are described below:

- The economic assumptions are developed for each asset class and for key economic parameters based on a combination of past experience, current economic environment and a reasonable range of future expectations. These assumptions are reviewed annually and updated as required. They are also subject to approval by the Superintendent under paragraph 15(3) of Regulation 2012-75. These assumptions are found in Appendix C.
- The CSJ SRP Plan's contributing member population is assumed to be stable in each year of the projection period. As such, each departure from the CSJ SRP Plan, for any reason, is assumed to be replaced by a new entrant. The new entrant population reflects the profile of new plan members expected in the future based on plan experience. The profile of new entrants used for this analysis is found under Table 1.9 in Section 1 of this report.

The risk management goals were tested as at January 1, 2017. The results of these tests combined with the results of the funding policy actuarial valuation at the same date will assist in determining the actions the Board of Trustees is required to take, or can consider, as applicable, under the terms of the Funding Policy.

The primary risk management goal must be achieved or exceeded:

- At January 1, 2013 (i.e. the Conversion Date);
- At the date a permanent benefit change as defined in the Regulations is made;
- At the date a benefit improvement as defined in the Regulations is made; or
- At the date contribution adjustments that exceed those provided under Section IV of the Funding Policy are implemented; and
- At the date temporary contributions are reduced before March 31, 2028 under the conditions provided for under Section IV of the Funding Policy.

The secondary risk management goals must be achieved or exceeded:

- At January 1, 2013 (i.e. the Conversion Date); or
- At the date a permanent benefit change as defined in the Regulations is made.

The definitions of "permanent benefit change" and "benefit improvement" are as follows:

"permanent benefit change" means a change that is intended to permanently change the formula for the calculation of the base benefits or ancillary benefits after the date of the change, including a change made in accordance with the funding excess utilization plan.

"benefit improvement" means an escalated adjustment for past periods or an increase in other ancillary benefits allowed under the Funding Policy.

Results of Stochastic Analysis as at January 1, 2017

The stochastic analysis undertaken as at January 1, 2017, took into account the main following items:

- Membership Data as at January 1, 2017 summarized in Appendix B;
- Economic and demographic assumptions as at January 1, 2017 for the funding policy valuation summarized in Section 1;
- Pension fund long-term target asset mix as summarized in Table A.4 of Appendix A;
- Stochastic projection assumptions as summarized in Appendix C;
- Risk management procedures described above;
- CSJ SRP Plan provisions summarized in Appendix D;
- Funding deficit recovery plan found under Section V of the Funding Policy (except for reduction in past or future base benefits);
- Funding excess utilization plan found under Section VI of the Funding Policy (excluding permanent benefit changes).

Based on the above, the results of the stochastic analysis for the various risk management goals as at January 1, 2017 are as follows:

Table 2.1 – Results of Stochastic Analysis for the Various Risk Management Goals

Risk Management Goal	Minimum Requirement under PBA	Result for CSJ SRP Plan as at January 1, 2017
Primary Goal [Regulation 7(1)] There is at least a 97.5% probability that the past base benefits at the end of each year will not be reduced over a 20-year period	97.5%	98.2% **PASSED**
Secondary Goal 1 [Regulation 7(3)(a)] Expected contingent indexing of base benefits of active members for service before the conversion date shall, on average over the next 20-year period, exceed 75% of the increase in the Consumer Price Index; or Expected contingent indexing of base benefits of retirees and deferred vested members for service rendered before the conversion date shall, on average over the next 20-year period, exceed 75% of the escalated adjustments specified in the pension plan immediately before it was converted to a shared risk plan	We estimated that the combined impact of the Secondary Goal 1 for active members, retirees and deferred vested member was a Minimum Requirement under the PBA of about **57% of the assumed increase in the Consumer Price Index.** This is the weighted average of 75% of CPI for active members, and 47% of CPI for retirees and deferred vested members.	93.4% of the assumed increase in the Consumer Price Index **PASSED**
Secondary Goal 2 [Regulation 7(3)(b)] The amount of ancillary benefits (other than contingent indexing) that are expected to be provided shall, on average over the next 20-year period, exceed 75% of the value of the ancillary benefits specified in the plan text	75% of ancillary benefit will be provided	At or above 97.9% *(See Note below)* **PASSED**

Note: The Funding Policy only provides for the reduction of one type of ancillary benefit under the funding deficit recovery plan at step 2. This is the replacement of early retirement reductions for post conversion service by full actuarial reductions for members not yet eligible to retire. We expect this ancillary benefit would be reduced in about 2.1% of our 2,000 20-yr scenarios. If this is the only ancillary benefit reduced, and it was eliminated completely, then we can expect that 97.9% of the value of ancillary benefits will be provided over the 20-year period.

Section 3 – Hypothetical Wind-up Valuation

A hypothetical wind-up valuation assumes that a pension plan is wound-up on the valuation date and member's benefit entitlements are calculated as of that date. Although this type of valuation is not required under Part 2 of the PBA for a shared risk plan, the Standards of Practice of the Canadian Institute of Actuaries require that actuarial valuation reports provide information with respect to hypothetical wind-up situations.

Section 16 of Regulation 2012-75 prescribes that if a shared risk plan is wound-up by the persons who established the plan within 5 years of its conversion date, the conversion of the plan is void and the plan has to be wound-up as a defined benefit plan under Part 1 of the PBA.

In conducting the hypothetical wind-up valuation as at January 1, 2017, we therefore made the assumption that the conversion would be void, and that the CSJ SRP Plan would be wound-up as at January 1, 2017 in accordance with rules found under Part 1 of the PBA.

We have valued the wind-up liability using discount rates consistent with the requirements of the PBA for plan wind-ups under Part 1. The PBA requires that benefits paid out to each member upon wind-up be not less than the cost to purchase an annuity for that member. Accordingly, we have followed the Canadian Institute of Actuaries' recommendations for the estimated cost of annuity purchases as at January 1, 2017.

Hypothetical Wind-Up Funded Status

The hypothetical wind-up funded status under the scenario postulated above, including the results of the last hypothetical wind-up valuation, is as follows:

Table 3.1 – Hypothetical Wind-Up Funded Status

	January 1, 2017	January 1, 2016
	$M	$M
Assets		
• Market value of assets	$549.3	$507.6
• Provision for expenses	(0.6)	(0.5)
• Total	$548.7	$507.1
Hypothetical wind-up liabilities		
• Active members	$388.8	$375.9
• Terminated deferred vested members	3.3	1.7
• Retired members, survivors and disabled	565.3	551.3
• Outstanding refunds and withholding amounts	0.3	1.0
• Total	$957.7	$929.9
Assets less liabilities on the hypothetical wind-up basis	($409.0)	($422.8)

The hypothetical wind-up funded status is presented for information purposes. There is no requirement under the PBA to fund the hypothetical wind-up deficit of the CSJ SRP Plan while it is not in a wind-up state.

Sensitivity Analysis on the Hypothetical Wind-up Basis

The Standards of Practice of the Canadian Institute of Actuaries require valuation reports to disclose the sensitivity of the liabilities to changes in the discount rate assumption. The table below illustrates the effect on the actuarial liabilities of using discount rates 1% lower than those used for the hypothetical wind-up valuation. All other assumptions and methods, as used in this valuation, were maintained.

Table 3.2 – Sensitivity of Actuarial Liabilities on the Hypothetical Wind-up Basis

	January 1, 2017	Discount Rates 1% lower
	$M	$M
Actuarial liabilities		
• Active members	$388.8	$503.0
• Terminated vested members	3.3	4.4
• Retired members, survivors and disabled	565.3	645.0
• Outstanding refunds and withholding amounts	0.3	0.3
• Total	$957.7	$1,152.7
Increase in actuarial liabilities		$195.0

Incremental Cost on the Hypothetical Wind-up Basis

The incremental cost on the hypothetical wind-up basis represents the present value of the expected aggregate change in the actuarial liabilities from January 1, 2017 to January 1, 2018, adjusted for expected benefit payments in the inter-valuation period. This incremental cost is estimated to be $21,774,000 as at January 1, 2017.

Hypothetical Wind-up Asset Valuation Method

Wind-up assets are equal to the market value of assets less an allowance for wind-up expenses. This valuation method is the same as the one used in the last valuation.

Hypothetical Wind-up Actuarial Cost Method

The hypothetical wind-up liabilities are determined using the accrued benefit (or unit credit) actuarial cost method. The hypothetical wind-up liabilities are equal to the actuarial present value of all benefits earned by members for services prior to the valuation date assuming the CSJ SRP Plan is wound up on the valuation date under Part 1 of the PBA. This method is the same as the one used in the last valuation. We also assumed that the disabled members who ceased to receive a disability pension from the pension plan as a result of the conversion would be re-instated as disabled pensioners under the wind-up scenario.

For valuation purposes, to determine eligibility for benefits and for any other uses, the age used is the age on the date of the nearest birthday.

Hypothetical Wind-up Actuarial Assumptions

The main actuarial assumptions used in the hypothetical wind-up valuation correspond to those prescribed by the PBA.

We have valued the hypothetical wind-up liability using discount rates consistent with the requirements of the PBA if the pension plan were to be wound up. The PBA requires that benefit paid out to each member upon wind-up be not less than the cost to purchase an annuity for that member. Accordingly, we have followed for that purpose the Canadian Institute of Actuaries' recommendations for the estimated cost of annuity purchases as at January 1, 2017.

The primary actuarial assumptions employed for the hypothetical wind-up actuarial valuation are summarized in the following table. All rates and percentages are annualized unless otherwise noted.

Table 3.3 – Hypothetical Wind-Up Actuarial Assumptions

	January 1, 2017	January 1, 2016
Discount rate		
• Discount rate for active members and deferred vested members not eligible for early retirement	2.2% per annum for 10 years, 3.5% per annum thereafter; or 3.21% per annum, if it produces a higher liability	2.1% per annum for 10 years, 3.7% per annum thereafter; or 3.13% per annum, if it produces a higher liability
• Discount rate for other members	3.21% per annum	3.13% per annum
Salary increases	None	None
Mortality	CPM 2014 Table, projected with improvement scale CPM-B	CPM 2014 Table, projected with improvement scale CPM-B
Termination of employment	None	None
Provisions for wind-up expenses	$600,000	$500,000
Retirement	Age that maximizes the value of the pension	Age that maximizes the value of the pension

Post-retirement indexing is also included in accordance with the terms of the Former CSJ Plan which provided for certain fixed rates of indexing dependent on the period of service.

Allowance has been made for administrative, actuarial and legal costs which would be incurred if the CSJ SRP Plan were to be wound up in full or in part. No allowance has been made for costs which may be incurred in respect of resolving surplus or deficit issues on plan wind up or the costs in respect of assets which cannot be readily realized.

The Canadian Institute of Actuaries (CIA) collects data annually from insurance companies and annually determines interest rates suitable for estimating the cost of single premium group annuities in hypothetical wind-up valuations. For pensioners and for active members and deferred vested members eligible for immediate retirement at the valuation date, the interest rate used in the present hypothetical wind-up valuation is an estimate of the rate that would be used by insurance companies in pricing single premium group annuities for annuitants already retired, based on the suggested rates for such annuitants published by the CIA.

The discount rate used for active members and deferred vested members not eligible for immediate retirement is the rate used for pensioners without adjustment, as suggested by the CIA as an appropriate estimate of the cost of deferred annuities based on their survey data from insurance companies.

Benefits are assumed to be settled by a single annuity purchase regardless of any limitation of capacity in the market for group annuity contracts.

Emerging experience differing from these assumptions will result in gains or losses, which will be revealed in future hypothetical wind-up actuarial valuations.

Termination Scenario

The termination scenario used in the hypothetical wind-up valuation includes the following assumptions:

- Plan wind-up would not result from employer insolvency.
- All assets could be realized at their reported market value.
- CSJ SRP Plan conversion would be void and the pension plan would be wound-up under Part 1 of the PBA.

Margin for Adverse Deviations

As specified by the Standards of Practice of the Canadian Institute of Actuaries, the hypothetical wind-up assumptions do not include a margin for adverse deviations.

Provision for Fees

Allowance has been made for administrative, actuarial and legal costs which would be incurred if the CSJ SRP Plan were to be wound up, based on sufficient and reliable data. It is assumed that the wind-up date, the calculation date and the settlement date are coincident, and as such, expenses related to investment policy reviews, investment and custodial fees are not included. Expenses related to the resolution of surplus and deficit issues are not taken into account. The amount of expenses is only an approximation and may differ significantly from real expenses incurred on plan wind-up, for example, in case of litigation, bankruptcy and/or eventual replacement by a third-party administrator.

Hypothetical Wind-up Incremental Cost

The method used to calculate the hypothetical wind-up incremental cost may be described as follows:

1. Present value of expected benefit payments between January 1, 2017 and January 1, 2018, discounted to January 1, 2017;

   Plus

2. Projected hypothetical wind-up liabilities as at January 1, 2018, discounted to January 1, 2017;

   Less

3. Hypothetical wind-up liabilities as at January 1, 2017.

Opinion on Hypothetical Wind-up Valuation

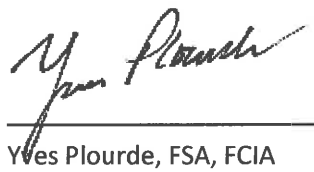
In my opinion, for the purposes of the hypothetical wind-up valuation section of the report:

- The membership data on which the valuation is based are sufficient and reliable for the purposes of the valuation.
- The assumptions are appropriate for the purposes of the valuation.
- The methods employed in the valuation are appropriate for the purposes of the valuation.

This hypothetical wind-up valuation report has been prepared, and my opinions given, in accordance with accepted actuarial practice in Canada.

The assumptions used under the hypothetical wind-up valuation of this report were reasonable at the time this actuarial valuation report was prepared.

Respectfully submitted,



Yves Plourde, FSA, FCIA

September 22, 2017

Date

Appendix A – Assets

Description of Plan Assets

The assets of the CSJ SRP Plan are held in custody by RBC Investor & Treasury Services and are invested by various professional investment management firms in accordance with the provisions of the Statement of Investment Policies and Goals (SIPG).

Statement of Market Value

The following table shows the asset mix as at December 31, 2016 and, for comparison, the asset mix as at December 31, 2015, extracted from audited financial statements prepared by Ernst & Young:

Table A.1 – Assets at Market Value

	December 31, 2016	December 31, 2015
Market value of assets	$	$
• Cash and short term	4,179,682	5,419,589
• Bonds and fixed income pooled funds	239,859,270	239,965,190
• Equities	248,200,966	207,431,777
• Real estate	55,025,487	52,930,613
• Accrued interest and dividends	527,437	545,670
• Due from the City of Saint John	1,498,162	1,346,906
Total market value of assets	549,291,004	507,639,745

Changes to Plan Assets

The following table shows changes to the CSJ SRP Plan assets during the inter-valuation period, based on market values. The reconciliation is based on the audited financial statements prepared by Ernst & Young.

Table A.2 – Reconciliation of Market Value of Assets

	2016
	$
Market value of assets at beginning of year	507,639,745
Receipts	
• Member contributions	6,379,490
• City contributions	18,570,307
• Investment income plus realized and unrealized capital appreciation and depreciation	47,575,176
Total receipts	72,524,973
Disbursements	
• Pensions paid	27,937,062
• Transfers and refunds	651,990
• Expenses (fees)	2,284,662
Total disbursements	30,873,714
Market value of assets at end of year	549,291,004

Return on Assets

The CSJ SRP Plan's assets earned the following rate of return, net of investment management fees and other expenses charged to the fund, based on our calculations which assume cash flow occurred in the middle of the period:

Table A.3 – Net Investment Return

Year	Rate of Return
	%
2016	9.0
2015	3.3
2014	11.0

Actuarial Value of Assets

We have used the fair market value of assets as provided in the audited financial statements produced by Ernst & Young. The actuarial value of assets as at January 1, 2017 was $549.3M.

Target Asset Mix

The statement of investment policy and goals for the CSJ SRP Plan, as last amended by the Board of Trustees on August 23, 2017, provides for the following long-term target asset mix.

Table A.4 – Long-term Target Asset Mix

Asset classes	Target
Short term	1.0%
Equities	
• Domestic equity	15.0%
• US equity	7.5%
• International equity	7.5%
Fixed income	
• Domestic long-term corporates	9.5%
• Domestic long-term provincials	9.5%
• Domestic corporates	10.0%
• Global high yield	5.0%
• Convertibles	5.0%
Alternative investments	
• Real estate	9.0%
• Mortgages	4.0%
• Infrastructure	6.5%
• Private equity	4.0%
• Private debt	6.5%
Total	100.0%

This long-term target asset mix was used to determine the discount rate assumption under the funding policy valuation and to conduct the stochastic analysis required under the PBA to assess the various risk management goals.

Appendix B – Membership Data

Description of Membership Data

Data on the CSJ SRP Plan membership was obtained from Aon Hewitt and the City of Saint John. The data was provided as at January 1, 2017.

The data was matched and reconciled with data provided for the previous valuation as at January 1, 2016. Basic data checks were performed to ensure that age, salary and service data were reasonable for the purposes of the valuation and to ensure that the data was accurate, complete and consistent with previous data.

Summary of Membership Data

The following tables summarize the data used for the valuations. These tables show the following:

B.1 Summary of Membership Data

B.2 Changes in Plan Membership

B.3 Age/Service Distribution for Active Members as at January 1, 2017

B.4 Age/Service Distribution for Disabled Members as at January 1, 2017

B.5 Distribution of Retired members and survivors by Age Groups as at January 1, 2017

Table B.1 - Summary of Membership Data

		January 1, 2017	January 1, 2016
Active members	Number	855	860
	Average salary	$73,559	$72,001
	Average age	44.9 years	44.6 years
	Average pensionable service	14.8 years	14.7 years
	Average annual accrued pension	$21,492	$21,213
Disabled members	Number	40	45
	Average annual accrued pension	$35,273	$34,135
	Average age	57.9 years	57.8 years
Terminated deferred vested members	Number	16	8
	Average annual pension	$10,733	$10,432
	Average age	46.5 years	46.6 years
Retired members and survivors	Number	849	838
	Average annual lifetime pension	$34,085	$32,970
	Average age	71.8 years	71.5 years

There were also 8 other inactive members and outstanding payments as at January 1, 2017, for a total amount owed of $0.3M.

Table B.2 – Changes in Plan Membership

	Active members	Disabled members	Deferred vested members	Retirees and survivors
Members at January 1, 2016	860	45	8	838
New members	32	---	---	---
Retirements	(24)	(5)	---	29
Terminations:				
• with refunds or transfers out	(4)	---	---	---
• with deferred pensions	(1)	---	1	---
• with outstanding payments	(7)	---	---	---
Deaths or cessation of pension	---	(1)	---	(30)
New survivor pensions	---	---	---	12
Transferred to Disabled	(1)	1	---	---
Reclassification of outstanding refunds	---	---	7	---
Members at January 1, 2017	855	40	16	849

Table B.3 – Age/Service Distribution for Active Members as at January 1, 2017

Years of Service		Under 25	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60 and Over	Total
0 - 4	Num.	11	45	49	25	20	12	8	3	2	175
	Avg. Sal.	49,458	56,631	59,175	59,000	60,386	58,915	71,607	116,789	*****	59,362
	Avg. Pen.	1,021	2,426	2,841	2,559	2,577	2,451	2,027	4,591	*****	2,508
5 - 9	Num.	0	19	45	46	38	23	8	5	1	185
	Avg. Sal.	0	72,159	72,649	73,047	73,385	78,438	74,762	60,724	*****	73,439
	Avg. Pen.	0	7,112	8,557	10,267	9,591	10,233	10,984	8,339	*****	9,382
10 - 14	Num.	0	0	6	43	29	16	6	3	0	103
	Avg. Sal.	0	0	81,219	75,554	76,391	76,072	71,809	60,578	0	75,546
	Avg. Pen.	0	0	16,662	16,727	18,053	17,075	14,078	12,074	0	16,861
15 - 19	Num.	0	0	0	7	29	39	10	5	2	92
	Avg. Sal.	0	0	0	81,630	89,537	82,927	75,341	57,518	*****	82,258
	Avg. Pen.	0	0	0	25,156	28,336	28,199	23,981	18,615	*****	26,883
20 - 24	Num.	0	0	0	0	3	34	39	27	13	116
	Avg. Sal.	0	0	0	0	84,083	77,571	75,989	59,553	63,220	71,405
	Avg. Pen.	0	0	0	0	33,559	33,557	32,691	25,647	29,229	30,940
25 - 29	Num.	0	0	0	0	0	8	64	28	19	119
	Avg. Sal.	0	0	0	0	0	83,947	86,322	78,671	66,934	81,266
	Avg. Pen.	0	0	0	0	0	41,589	43,466	40,742	34,869	41,326
30 +	Num.	0	0	0	0	0	0	15	39	11	65
	Avg. Sal.	0	0	0	0	0	0	85,777	87,818	88,826	87,518
	Avg. Pen.	0	0	0	0	0	0	48,729	54,241	58,011	53,607
Total number		11	64	100	121	119	132	150	110	48	855
Avg. Sal.		49,458	61,241	66,561	71,532	76,139	77,813	80,867	75,990	70,209	73,559
Avg. Pen.		1,021	3,817	6,242	11,832	15,647	23,571	34,774	37,576	36,286	21,492

Average age: 44.9

Average number of years of service: 14.8

Notes: The age is computed at the nearest birthday.

Years of service means the number of years credited for pension plan purposes, fractional parts being rounded to the nearest integer.

Membership for active members is composed of 678 males and 177 females.

Table B.4 – Age/Service Distribution for Disabled Members as at January 1, 2017

Years of Service		Under 50	50-54	55-59	60 and Over	Total
Under 20	Num.	1	0	0	1	2
	Avg. Sal.	*****	0	0	*****	*****
	Avg. Pen.	*****	0	0	*****	*****
20 - 24	Num.	1	3	4	1	9
	Avg. Sal.	*****	69,503	49,995	*****	56,661
	Avg. Pen.	*****	32,272	22,814	*****	26,322
25 - 29	Num.	0	4	5	3	12
	Avg. Sal.	0	66,516	63,605	48,332	60,757
	Avg. Pen.	0	40,172	34,306	27,241	34,495
30 +	Num.	0	1	8	8	17
	Avg. Sal.	0	*****	71,240	62,866	65,764
	Avg. Pen.	0	*****	46,007	40,098	42,185
Total number		2	8	17	13	40
Avg. Sal.		*****	64,965	63,995	57,276	61,970
Avg. Pen.		*****	35,726	37,108	34,356	35,273

Average age: 57.9

Notes: The age is computed at the nearest birthday.

Years of service means the number of years credited for pension plan purposes, fractional parts being rounded to the nearest integer.

Membership for active disabled members is composed of 35 males and 5 females.

Table B.5 – Distribution of Retired members and survivors by Age Groups as at January 1, 2017

Age Group	Number	Total Annual Pension
Under 60	75	$3,178,421
60-64	157	6,926,083
65-69	177	6,902,424
70-74	148	5,002,789
75-79	114	3,169,358
80-84	87	2,066,710
85-89	52	1,097,669
90 and over	39	594,949
Total	849	$28,938,403

Average age: 71.8

Notes:

Age groups are based on exact age.

The pension used is the pension payable as at January 1, 2017.

Membership for pensioners is composed of 604 males and 245 females.

Appendix C – Stochastic Projection Assumptions

Our assumptions for stochastic analysis are built each year using Conference Board of Canada (CBoC) forecasts, internal research, inflation expectations and by surveying the asset manager universe. This ensures we are not using inputs that are out of touch with broader expectations. We strive for a moderate level of conservatism in our assumptions, as high expectations can lead to biased results, understating the true risk level of pension plans.

Stochastic projection assumptions are updated annually by Morneau Shepell Asset and Risk Management with an anchor date of December 31st and a time horizon of 25 years. A multi-stage process is used to set the economic assumptions. First, a long term inflation rate assumption is selected based primarily on the current Bank of Canada Monetary Policy. Volatility for inflation is based on historical data since the early 1990's when the current monetary policy was introduced. Market implied inflation is used as an indicator of the market expectation for long term trends for inflation. Secondly, historical and current bond data is used to determine the long term interest rates for key bond indices. It is assumed that current yields will revert to the projected long term rates over a projected period of 10 years. Volatility assumptions are based on historical data modified to reflect current low yield rates. Expected return levels and standard deviations for Canadian bond indices are generated in a stochastic simulation approach.

The next stage is to determine nominal equity return assumptions. The process uses multiple sources including our inflation assumptions, historical data, GDP and other economic data, growth forecasts and dividend information. Standard deviations and correlations of equity returns are mainly derived from historical data. Purchasing power parity is assumed in setting foreign equity return assumptions. Historical data is used to measure the return and volatility spreads between small-cap and large-cap equities. Alternative asset classes are primarily based on historical data but adjusted by factors specific for each asset class.

The following expected return and volatility by asset class was used as at January 1, 2017:

Table C.1 – Expected Nominal Return and Volatility (standard deviation of return) by Asset Class

	Expected Return	Volatility
Inflation	2.25%	1.2%
Asset classes		
Short-term (ST)	1.95%	1.6%
Equities		
• Domestic equities (DE)	6.75%	16.7%
• US Equities (USE)	6.70%	17.4%
• International equities (IE)	7.35%	16.2%
Fixed income		
• Domestic long term corporates (DLTC)	4.50%	8.9%
• Domestic long-term provincials (DLTP)	3.55%	11.3%
• Domestic corporates (DC)	3.70%	6.3%
• Global high yield (GHY) and Convertibles (C)	5.65%	12.1%
Alternative investments		
• Real estate (RE) and Mortgages (M)	6.25%	10.5%
• Infrastructure (I)	6.90%	13.6%
• Private equity (PE)	10.25%	24.2%
• Private debt (PD)	5.80%	8.0%

For every year in the 20-year projection, expenses of 10 basis points to reflect the cost of passive management is deducted from the assets (the additional cost of active management is expected to be achieved in addition to the expected returns shown above and therefore are not included in the analysis). In addition, we included a flat expense of $525,000 (in 2017, and increased with assumed inflation thereafter), to cover all other administrative expenses paid from the fund other than passive management.

The following correlation among the various asset classes identified in Table C.1 was also used as at January 1, 2017:

Table C.2 – Correlation among Asset Classes

	ST	DC	DLTC	DLTP	DE	USE	IE	GHY & C	RE & M	I	PE	ABS*
ST	1.00	-0.15	-0.22	-0.07	-0.04	-0.03	0.02	-0.10	0.28	0.00	-0.05	0.10
DC		1.00	0.90	0.80	0.20	0.14	0.05	-0.21	-0.16	0.21	0.13	0.15
DLTC			1.00	0.88	0.28	0.21	0.09	-0.06	0.00	0.27	0.21	0.25
DLTP				1.00	0.02	0.10	-0.10	-0.21	0.16	0.28	0.05	0.06
DE					1.00	0.34	0.57	0.39	0.02	0.11	0.48	0.70
USE						1.00	0.65	0.32	0.08	-0.06	0.56	0.40
IE							1.00	0.41	0.25	-0.07	0.46	0.41
GHY & C								1.00	0.03	0.17	0.31	0.29
RE & M									1.00	0.13	0.07	0.13
I										1.00	0.49	0.37
PE											1.00	0.72
ABS*												1.00

** Due to limited historical data available to model future returns, Private debt was modeled using a proxy of 50% of Global high yield and 50% of Absolute return (ABS). We feel the blend of these two asset classes best approximates the characteristics of Private debt and we feel this is an acceptable proxy for this valuation. Correlations between the Absolute return and other asset classes are provided in the above table.*

Using a Monte Carlo simulation technique, the expected returns, volatility and correlation of the various asset classes shown above are used to model 2,000 series of alternative economic scenarios over 20-year periods. This provides at least 40,000 observations from which to measure whether the risk management goals have been achieved.

This exceeds the minimum requirements under the PBA of 1,000 series of economic scenarios.

For each of these scenarios and for each year, the financial position of the CSJ SRP Plan is measured on a funding policy basis. The discount rate of 4.5% per year is used to project the funding policy liability and to determine the present value of excess contributions throughout the projection period. The projection of the liability and future cash flows under the stochastic analysis uses the same demographic assumptions as used for the calculation of the funding policy liability, as required under paragraph 15(2)(c) of Regulation 2012-75.

The risk management procedures are described in Section 2 of this report.

Appendix D – Summary of Plan Provisions

The following is a brief summary of the main provisions of the City of Saint John Shared Risk Plan ("CSJ SRP Plan") effective January 1, 2017. For an authoritative statement of the precise provisions of the CSJ SRP Plan, reference must be made to the official CSJ SRP Plan documents.

Introduction

Effective January 1, 2013, the Former CSJ Plan was converted to the CSJ SRP Plan. The administration of the CSJ SRP Plan continues to be the responsibility of an independent Board of Trustees.

The primary purpose of the CSJ SRP Plan is to provide pensions to eligible employees after retirement and until death in respect of their service as employees. The purpose of the CSJ SRP Plan is to provide secure benefits to members of the plan without an absolute guarantee but with a risk focused management approach delivering a high degree of certainty that Base Benefits can be met in the vast majority of potential future economic scenarios.

All future cost of living adjustments for current and future retirees and other ancillary benefits under the CSJ SRP Plan shall be provided only to the extent that funds are available for such benefits, as determined by the Board of Trustees in accordance with applicable laws and the CSJ SRP Plan's Funding Policy.

Base and ancillary benefits can also be reduced. Therefore, they are not "guaranteed" benefits. The benefits can only be met if contributions and plan experience, most importantly investment performance, allow this to happen. The triggers and timing of any potential benefit reductions would be administered by Board of Trustees, subject to applicable laws and the CSJ SRP Plan's Funding Policy.

Eligibility and Participation

Each member of the Former CSJ Plan joins the CSJ SRP Plan on January 1, 2013.

Each employee who commences full-time employment on or after January 1, 2013 is required to join the CSJ SRP Plan from the first day of the month coincident with or next following the date of employment. Each part-time employee is eligible to join when they meet the minimum requirements under the PBA. However, such part-time employees will be required to join when they meet the eligibility requirements effective January 1, 2015.

Required Contributions

Effective January 1, 2013, each regular member is required to contribute 9.0% of earnings. Each police and fire member is required to contribute 12.0% of earnings. The City of Saint John contributes 11.4% of earnings on behalf of regular members, and 15.2% on behalf of police and fire members. In addition, the City of Saint John contributes additional temporary contributions of 17.0% of earnings from April 1, 2013 to March 31, 2028.

Contributions are waived for periods during which a member is in receipt of long term disability benefits from a long-term disability plan sponsored by the City until recovery or age 65. Pensionable service continues to accrue in respect of such periods, using pensionable earnings earned by other employees in the same employment classification as the member, subject to limits on deemed earnings imposed under the Income Tax Act.

Contribution rates are subject to change in accordance with triggers found under the Funding Policy for the CSJ SRP Plan.

Normal Retirement

The normal retirement date is the first day of the month coincident with or next following the member's sixty-fifth birthday.

A member's annual normal retirement pension is equal to the sum of:

(A) In respect of service before January 1, 2013, the product of:

(i) the number of years of the member's pensionable service before January 1, 2013, and

(ii) 2.0% of the annual average of the best three (3) consecutive years of earnings at January 1, 2013;

and

(B) In respect of service from January 1, 2013, 1.8% of the member's earnings for each calendar year.

Pensions accrued above are subject to cost-of-living adjustments, before and after retirement, every January 1st following January 1, 2013, subject to approval by the Board of Trustees, and in accordance with the trigger requirements found under the Funding Policy for the CSJ SRP Plan.

The cost-of-living adjustments granted up to and including January 1, 2017 under "Other Actions", Steps 1 and 2, of the Funding Excess Utilization Plan of the Funding Policy are related to increases in the Consumer Price Index and are as follows:

Effective Date	Applicable To Benefits Accrued As Of	COLA Granted
January 1, 2014	January 1, 2013	0.40%
January 1, 2015	January 1, 2013	1.05%
January 1, 2015	January 1, 2014	0.90%
January 1, 2016	January 1, 2013	0.05%
January 1, 2016	January 1, 2015	1.95%
January 1, 2017	January 1, 2016	1.12%

Further cost-of-living adjustments to accrued pensions of active and disabled members granted up to and including January 1, 2017 under "Other Actions", Step 3, of the Funding Excess Utilization Plan of the Funding Policy are related to increases in average wage that are in excess of increases in the Consumer Price Index and are as follows:

Effective Date	Applicable To Benefits Accrued As Of	COLA Granted
January 1, 2016	January 1, 2013	1.00%
January 1, 2016	January 1, 2014	0.88%
January 1, 2016	January 1, 2015	0.69%
January 1, 2017	January 1, 2016	0.66%

Normal, Automatic and Optional Forms of Pension

The normal form of pension is a pension payable in equal monthly installments commencing on the member's pension commencement date and continuing thereafter during the lifetime of the member, subject to a guarantee that the member's contributions with interest will at least be paid in total.

For a member with a spouse or common-law partner, the automatic form of pension is a joint and survivor pension which is payable in equal monthly installments for the life of the member and payable to the member's spouse or common-law partner after the member's death at 60% of the amount paid to the member.

A member can also elect to receive an optional form of pension providing a survivor pension of 100% to his/her spouse on an actuarially equivalent basis.

Any form of pension in effect before the Conversion Date for individuals who retired before the Conversion Date will remain in effect.

Vesting Date

A member is considered vested when he/she has reached five (5) years of continuous employment or two (2) years of plan membership. Those who had reached their vesting date under the Former CSJ Plan at January 1, 2013 were grandfathered under the CSJ SRP Plan.

Early Retirement

Early retirement is permitted on or after age 55 if the member has reached his/her vesting date. For those who were members of the Former CSJ Plan, they can also retire early when the sum of age and pensionable service (counting also pensionable service after the Conversion Date) reaches 85, if earlier.

The portion of the lifetime pension accrued for service before January 1, 2013 is reduced as follows:

- if the member is eligible for an immediate pension at termination of employment:
    - 5/12% per month (5.0% per year) that pension commences before attainment of age 65, or if earlier when the member would have reached 85 points had he continued in employment.
- if the member is not eligible for an immediate pension at termination of employment:
    - 5/12% per month (5.0% per year) that pension commences before attainment of age 65.

The portion of the lifetime pension accrued for service between January 1, 2013 and December 31, 2013 is reduced as follows:

- if the member's age and pensionable service index at the date of termination of employment is less than 85 points:
    - 1/2% per month (6.0% per year) that the pension commences before attainment of age 65 (or age 60 for members in public safety occupations).

- if the member's age and pensionable service index at the date of termination of employment is 85 points or higher:
    - no early reduction applicable for this period of service

The portion of the lifetime pension accrued for service on and after January 1, 2014 is reduced by 1/2% per month (6.0% per year) that the pension commences before attainment of age 65 (or age 60 for members in public safety occupations).

Benefits on Termination of Employment

If a member terminates employment prior to his/her vesting date, the member is entitled to a refund of the total amount of his/her own contributions with interest.

If a member terminates employment before being eligible for an immediate pension, but after his/her vesting date, the member may elect to receive:

(i) a deferred lifetime pension payable from normal retirement date equal to the accrued pension to which the member is entitled as at his/her date of termination in accordance with the formula specified above for the normal retirement pension; or

(ii) to transfer the termination value of the deferred lifetime pension calculated in accordance with the PBA, to another pension plan, a prescribed retirement savings arrangement, or an insurance company, as allowed under the PBA.

The Termination Value will not be less than a member's own contributions with interest.

Death Benefits

If a member dies prior to his/her vesting date, the benefit payable is a refund of the member's own contributions with interest.

If the member dies after his/her vesting date but before pension commencement, the following benefits will be paid:

- for service before January 1, 2013:
    - 60% of the accrued pension for such service at death is first payable to the surviving spouse or common-law partner; dependent pensions for such service may also be payable to eligible dependents, if there is no spouse; and additional benefits may be payable if the death is as a result of an accident, pro-rated for such service.

      The value of the death benefits is not to be less than the Termination Value of the accrued pension for such service at death.
- for service on and after January 1, 2013:
    - the Termination Value, as defined under the PBA, will be refunded to the member's spouse or common law partner, or to the beneficiary if there is no spouse or common law partner. The Termination Value will not be less than a member's own contributions with interest.

In the event of death after pension commencement, the benefit payable is determined in accordance with the form of pension selected by the member at retirement.

Appendix E – Summary of Funding Policy

The following is a brief summary of the main provisions of the Funding Policy for the City of Saint John Shared Risk Plan ("CSJ SRP Plan") effective January 1, 2017. For an authoritative statement of the precise provisions of the Funding Policy, reference must be made to the official document.

Purpose of Plan and Funding Policy

The purpose of the CSJ SRP Plan is to provide secure pension benefits to members and former members without an absolute guarantee, but with a risk focused management approach delivering a high degree of certainty that base benefits can be met in the vast majority of potential future economic scenarios.

The primary focus is to provide a highly secure lifetime pension at normal retirement age. However, the intention is that additional benefits may be provided depending on the financial performance of the Plan.

The Funding Policy is the tool used by the Board of Trustees to manage the risks inherent in a shared risk plan. The Funding Policy provides guidance and rules regarding decisions that must, or can, be made by the Board of Trustees around funding levels, contributions and benefits.

Benefit Objectives

Upon conversion, accrued pension for all members are maintained. Benefits to retirees and survivors continue at the same level, but future indexing becomes contingent on the ability of the CSJ SRP Plan to pay such benefits. Accrued benefits for active members are calculated at conversion date and are increased on a contingent basis similar to retirees rather than continuing to use a final average earnings formula. Early retirement rules for service before the conversion date are maintained.

Benefit accruals under the Plan after the conversion is at 1.8% of earnings (not including overtime) and are payable at normal retirement age of 65 (age 60 for police and fire employees) with a 6% per year reduction for early retirement. This change reflects anticipated continued increases in life expectancy. The overall plan design objective with respect to retirement age is to provide each cohort of plan members with about the same expected number of years of pension payments for a similar amount of pension in current dollars at retirement. None of the above are guarantees.

Risk Management

In accordance with legislation on shared risk plans, the primary risk management goal is to achieve a 97.5% probability that base benefits will not be reduced over the following 20 years.

In addition, secondary risk management goals are to provide, on average, contingent indexing on base benefits (for all members) in excess of 75% of CPI over the next 20 years, and to achieve at least a 75% probability that the ancillary benefits described in the Plan text at conversion can be provided over the next 20 years.

Contributions

The initial employee contribution rate shall be 9% of earnings for all employees other than police and fire employees in Public Safety Occupations. The initial Employee contribution rate shall be 12% of earnings for police and fire Employees in Public Safety Occupations (provided that Employees who were formerly employed in a Public Safety Occupation before accepting a non-unionized position may elect to contribute at this rate in accordance with the Plan text), subject to the ITA.

Contribution adjustments may be made by the Board of Trustees. The Board of Trustees must trigger an increase in the Initial Employee contribution rate of 25% (capped at 2.75% of earnings) if the open group funded ratio of the Plan, as defined by the PBA, falls below 100% for two successive year ends (before taking into account any initial contribution rates increase), until such time as the open group funded ratio reaches 105% without considering the effect of the contribution increase and the primary risk management goal is met.

A reduction in employee contributions of up to a total of 1.5% of earnings can be triggered by the Board of Trustees if the conditions set forth in the funding excess utilization plan are met.

All employee increases and decreases described above are also applied to the initial employer contributions.

Commencing April 1, 2013, the Employer is required to make temporary contributions at the rate of 17% of earnings of all Employees. The temporary contributions shall cease on April 1, 2028 or when the Plan achieves an open group funded ratio, as defined in the PBA, of 150%, provided that such temporary contributions shall not cease before April 1, 2023, subject to the ITA.

Funding Deficit Recovery Plan

The funding deficit recovery plan must be implemented by the Board of Trustees if the open group funded ratio of the Plan falls below 100% for two successive plan year ends.

The funding deficit recovery plan consists of the following actions in the order of priority as listed below:

1. Increase initial contribution rates as stipulated in Section IV of the Funding Policy;
2. Change early retirement rules for post-conversion service for members who are not yet eligible to retire and receive an immediate pension under the terms of the Plan to a full actuarial reduction for retirement before age 65 for all Employees other than police and fire Employees who are employed in Public Safety Occupations and for retirement before age 60 for police and fire Employees who are employed in Public Safety Occupations;
3. Reduce base benefit accrual rates for future service after the date of implementation of the deficit recovery plan by not more than 5%;
4. In addition to the reduction in step 3 above, reduce base benefits on a proportionate basis for all members regardless of membership status for both past and future service in equal proportions.

The above actions shall be taken one by one until such time as the funding goals under the Regulation are met.

The base benefit reduction in point 4, if required, shall be such that the funding goals under the Regulation for such purposes are achieved.

Action items under steps 1 to 3 shall take effect no later than 12 months following the date of the funding policy valuation report that triggered the need for the change, and actions under step 4 shall take effect no later than 18 months following the date of the funding policy valuation report that triggered the need for the actions.

Funding Excess Utilization Plan

The funding excess utilization plan describes the actions the Board of Trustees must take or consider when the open group funding levels exceeds 105%. If the open group funding level is at 105% or less or initial contribution rate increases are in effect, there are no actions that can be taken under the funding excess utilization plan.

The excess available for utilization is as follows:

- $1/5^{th}$ of the funds that make up the excess of the open group funding level at the valuation date (to a maximum of 140%) over 105%; PLUS
- 100% of the excess above 140%.

If base benefits and/or ancillary benefits have been reduced, all excess available for utilization must first be used to reinstate those reductions. Afterwards, the following actions are to be taken in the following order of priority and no action can be taken until the immediately preceding action in the list below has been fully implemented:

1. Provide indexing of base benefits up to the increase in the average Consumer Price Index (CPI) for Canada for the 12-month period preceding the date of the funding policy valuation report over the average of the CPI for the immediately preceding 12-month period. The indexation percentage applied to base benefits shall be the same for all members.
2. Provide indexing of base benefits for all members for every year that was missed or only partially covered since the Conversion Date, starting with the oldest period for which less than the full increase in the average CPI was provided up to the most recent in chronological order.
3. Provide a further increase to benefits of members for a period while they were not in receipt of a pension that is before the funding policy valuation date that triggered the action up to the rate of increase in the average wage as determined under the ITA and subject to Section 8504 of the regulations to the ITA; provided that no such increase would result in a requirement to calculate Past Service Pension Adjustments.
4. Provide for unreduced early retirement benefits not more generous than the Pre-Conversion Plan unreduced early retirement rules.
5. Provide for other ancillary benefits up to those that are comparable to the ancillary benefits under the Pre-Conversion Plan.
6. Establish a reserve to cover the next 10 years of potential contingent indexing based on CPI.
7. Apply contribution adjustments of up to 3%, as allowed under Section IV of the Funding Policy.

Actions 1 to 6 can be applied with excess funds available. If all improvements from 1 through 6 above have been made and the open group funded ratio is still in excess of 150%, then action 7 can be undertaken. After such

actions have been undertaken, the Trustees may consider permanent benefit changes subject to the approval of the Employer and Unions and subject to most members being able to benefit from the changes.

Except for the timing of contribution reductions, the timing of the above actions shall be the first of the year that is 12 months after the date of the funding policy valuation report that triggered the actions.

Actuarial Assumptions

A funding policy actuarial valuation shall be conducted by the Plan's actuary at January 1st of each year. The discount rate is 4.5% per year. The discount rate can be changed at a future valuation with the consent of the City and the Unions. Other assumptions may be changed as experience evolves.

Appendix F – Plan Administrator Confirmation Certificate

With respect to the Actuarial Valuation Report as at January 1, 2017 of the City of Saint John Shared Risk Plan (CSJ SRP Plan), I hereby confirm that to the best of my knowledge:

- the data regarding the CSJ SRP Plan members and beneficiaries provided to Morneau Shepell as at January 1, 2017 constitutes a complete and accurate description of the information in the plan files;
- copies of the official CSJ SRP Plan documents, Funding Policy, Statement of Investment Policies and Goals and all amendments to date were provided to Morneau Shepell; and
- there are no events subsequent to January 1, 2017, other than those already identified in this report, which would materially affect the results of the valuation.

The CSJ SRP Plan Board of Trustees

Frederick Slipp

Signature

Name: FREDERICK SLIPP

Title: CHAIR

Date: 19TH SEPTEMBER 2017

MORNEAU SHEPELL

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