Actuarial Report on

British Columbia Municipal Pension Plan

Actuarial Valuation
as at December 31, 2012

Vancouver, B. C.

September 23, 2013

Eckler

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Actuarial Report Highlights

BC Municipal Pension Plan

December 31, 2012

An actuarial valuation of the Municipal Pension Plan (Plan) was completed as at December 31, 2012. Its purpose was to determine the financial or actuarial position of the Plan as at December 31, 2012 and to report on the adequacy of the member and employer contribution rates.

Scope of the Valuation

The main valuation focuses on the Basic Account and the funding of the Basic, non-indexed benefits. It excludes liabilities for:

- Future indexing funded via fixed contributions to the Inflation Adjustment Account (IAA);
- Post-retirement group benefits provided on a pay-as-you-go basis via carve outs from the IAA and Basic Account contributions; and
- Retirement Annuity Account (RAA), containing funds accumulated on a money purchase basis.

Furthermore, it ignores the limits imposed by the *Income Tax Act* ("*ITA*") on benefits provided from registered pension plans - such excess benefits are paid on a current cash basis through the Supplemental Benefits Account, which is maintained at a zero balance.

We have, however, performed supplementary valuations as follows:

- For basic and indexed benefits, on the assumption that indexed benefits are to be fully funded, in advance, as for basic benefits; and
- Limiting benefits to those permitted under the *ITA*; this is done both for basic benefits only, and for basic plus indexed benefits.

Key Changes Included in the Valuation

- Effective July 1, 2011, the member contribution rates to the Basic Account increased by 0.81% of salary for Groups 1-4 and by 0.86% of salary for Group 5.
- Effective July 1, 2011, the employer contribution rates to the Basic Account increased by 0.93% of salary for Groups 1 and 4, by 0.81% of salary for Group 3, and decreased by 0.71% for Group 2 and by 0.66% of salary for Group 5.

There were no other benefit changes that had a material financial impact on the Plan.

Actuarial Methods and Assumptions

The actuarial liabilities include the value of benefits accrued by members as at December 31, 2012 as well as future benefits expected to be earned by existing members. Asset values are based on smoothed market values (limited to not more than 110%, nor less than 90%, of market value), plus projected future contributions based on entry-age normal contribution rates and the existing amortization rates.

The contribution rates are tested on the entry-age funding method. Under this method, a long-term, entry-age rate, which would fully fund benefits for future new entrants to the Plan, is calculated. The surplus (unfunded liability) is then amortized according to the requirements of the Board's Funding Policy. This method is designed to maintain costs at a level percentage of salaries over an extended period. The resulting contribution rate is then tested against the going-concern requirements of the *BC Pension Benefits Standards Act ("PBSA")* as required by the Joint Trust Agreement.

Key long-term assumptions used include:

- Annual Investment Return - 6.50% (unchanged from the previous valuation);
- Annual Salary Increase - 3.75%, plus seniority (unchanged from the previous valuation);
- Annual Indexing - 0.00% for basic costs, 3.00% for indexed costs (unchanged from the previous valuation).

Actuarial Position

The valuation indicates a deterioration in the actuarial position for the Basic Account on the entry-age normal contribution basis. A new unfunded liability of $1,370 million has emerged since the December 31, 2009 valuation:

Basic Benefits Only, Without *ITA* Maximum: ($000's)	**2012**	**2009**
Assets	38,047,723	33,526,101[1]
Liabilities	39,418,046	33,526,101
Surplus (Unfunded Liability)	**(1,370,323)**	**0**[1]

The supplementary fully indexed valuation results are:

Basic and Indexed Benefits, Without *ITA* Maximum: ($000's)	**2012**	**2009**
Assets	46,681,569	41,295,956[2]
Liabilities	54,077,899	45,447,544
Surplus (Unfunded Liability)	**(7,396,330)**	**(4,151,588)**[2]

When the *ITA* maximums are recognized, the above surplus (unfunded liability) figures change modestly, to:

Benefits Limited to *ITA* Maximums ($000's)	**2012**	**2009**
Basic benefits only	(1,187,666)	113,023
Basic and indexed benefits	(7,147,322)	(3,999,571)

Main Reasons for Changes in Actuarial Position

The main reasons for deterioration in the actuarial position are:

- Smoothed investment returns lower than assumed;
- Actual contributions lower than previously assumed; and
- Changes in the demographic assumptions;

Partially offset by

- Actual salary increases lower than previously assumed.

[1] The 2009 report showed a $1,728,393 thousand unfunded liability on the entry age basis, after taking into account the present value of then currently existing amortization requirements of $675,242 thousand. When amortized over 15 years (to 2024) this resulted in an amortization requirement of 1.75%. Showing the amortization requirement as an asset, as it is now part of the required contribution rate, reduces the unfunded liability to zero.

[2] Including $1,728,393 thousand amortization requirement established at the 2009 valuation.

Member and Employer Contribution Rates - Basic Non-Indexed Benefits

Members contribute 8.3% (Group 1, 2 and 4 members) and 9.82% (Group 5 members) of salaries, less 1.5% of salaries up to the YMPE, for basic non-indexed benefits; employers contribute at different rates for each group, less amounts allocated to Medical Services Plan premiums.

The employer contributions are currently on a combination of a "doubling" basis and a level basis – for the doubling portion, the pre-2003 valuation contribution rates apply when a member is below age 50 (for Groups 1 and 4 members) or age 45 (Group 2 and 5 members); at ages above these, double the rates apply. Contribution rate increases since the 2003 valuation are on a level basis and do not “double”.

We have calculated all of the theoretical long-term costs assuming the "doubling" feature is eliminated.

The Joint Trust Agreement requires that the contribution rates comply with the going-concern requirements of the provincial pension standards legislation (the *PBSA*).

	2012 (%)		
Current contribution rates[1, 2]	**Member**	**Employer**	**Total**
Group 1	8.30	9.10	17.40
Group 4	8.30	9.61	17.91
Group 2	8.30	12.75	21.05
Group 5	9.82	13.74	23.56
Average	**8.35**	**9.70**	**18.05**
Average Required Rates			
Entry-age normal cost rates			15.37
Total PBSA amortization			4.06
Additional Group 5 amortization (to 2024)[3]			0.23
PBSA minimum rate - Average			**19.44**
Required Rate Increase			1.39

The minimum required contribution rate of 19.44%[1] (integrated) is 1.39% higher than the current equivalent level rate of 18.05%[2] (integrated). Under the transition arrangements of the Joint Trust Agreement, this increase in the required contribution rate must be shared between members and employers. After dividing and rounding, the increase is 0.7% of salaries each, for a total Basic contribution rate of 19.45% integrated.

[1] Less 1.5% of salary up to the YMPE (for each of the members and the employers).

[2] The current rates are shown on an equivalent "non-doubling" basis, based on current payrolls.

[3] This amount was established at the 2009 valuation to allow for the fact that members transferring from Group 2 are older than the assumed entry age to Group 5 and therefore the value of their future contributions at the entry age rate is less than the value of the corresponding future liability. This amount amortizes the shortfall over 15 years.

Combined Basic plus IAA Contribution Rates

In summary, adding the required increase of 0.7% to each of the current member and employer rates, the required contribution rates following this valuation are:

	Required (%)				
	Basic[1]		IAA	Total[1]	
Members					
Groups 1, 2, 4	9.00		1.00	10.00	
Group 5	10.52		1.42	11.94	
Employers	**Doubling age**			**Doubling age**	
	Below	**Above**		**Below**	**Above**
Group 1	7.52	12.42	0.20	7.72	12.62
Group 4	8.02	13.42	0.20	8.22	13.62
Group 2	9.48	17.98	0.20	9.68	18.18
Group 5	11.00	19.50	0.62	11.62	20.12

The revised contribution rates comply with the going-concern requirements of the provincial pension standards legislation (i.e. the *PBSA*).

The required contribution rates for the employers shown above are less than the theoretical requirements for Group 1 and Group 5 members and more than the requirements for Group 2 members. The Board (and the Plan partners) may wish to rebalance the rates by group so as to bring them closer to the theoretical requirements.

The *ITA* requires that individual member contributions not exceed the lesser of 9% of salaries or $1,000 plus 70% of the pension credit, though this condition may be waived by the Minister of Finance provided members do not contribute more than half the cost of benefits. Following this valuation, a waiver will be required for all groups.

[1] Integrated.

The Municipal Pension Board of Trustees
4th Floor – 2957 Jutland Road
Victoria BC V8T 5J9

I. Scope of the Valuation

In accordance with Article 10 of the Joint Trust Agreement (the "JTA") and on the instructions of the Municipal Pension Board of Trustees (the "Board of Trustees"), we have completed an actuarial valuation of the Basic Account of the Municipal Pension Plan (the "Plan") as at December 31, 2012 and are pleased to submit this report thereon. The primary purpose of this valuation is to determine the financial or actuarial position of the Basic Account as at December 31, 2012 and to report on the adequacy of the member and employer contribution rates.

The main valuation focuses on the Basic Account and the funding of the Basic, non-indexed benefits. It excludes liabilities for:

- Future indexing funded via fixed contributions to the Inflation Adjustment Account ("IAA");
- Post-retirement group benefits provided on a pay-as-you-go basis via carve outs from the IAA and Basic Account contributions; and
- Retirement Annuity Account ("RAA"), containing funds accumulated on a money purchase basis.

Furthermore, it ignores the limits imposed by the *Income Tax Act* ("*ITA*") on benefits provided from registered pension plans - such excess benefits are paid on a current cash basis through the Supplemental Benefits Account, which is maintained at a zero balance.

We have, however, performed supplementary valuations as follows:

- For basic and indexed benefits, on the assumption that indexed benefits are to be fully funded, in advance, as for basic benefits; and
- Limiting benefits to those permitted under the *ITA*; this is done both for basic benefits only, and for basic plus indexed benefits.

The intended users of this report are The Board of Trustees, the Financial Institutions Commission of British Columbia ("FICOM") and Canada Revenue Agency ("CRA"). This report is not intended or necessarily suitable for other purposes than those listed above.

II. Changes in Plan

The last valuation of the Plan, prepared as at December 31, 2009 and included in our report dated September 22, 2010, determined the actuarial position of the Plan as amended to December 31, 2009. Since then, a number of changes have been made to the Plan. The major changes affecting its financing include:

- Effective July 1, 2011, the member contribution rates to the Basic Account increased by 0.81% of salary for Groups 1-4 and by 0.86% of salary for Group 5.
- Effective July 1, 2011, the employer contribution rates to the Basic Account increased by 0.93% of salary for Groups 1 and 4, by 0.81% of salary for Group 3, and decreased by 0.71% for Group 2 and by 0.66% of salary for Group 5[1].

There were no other benefit changes that had a material financial impact on the Plan.

The changes, and the main provisions of the Plan, are described in Appendix A.

[1] These adjustments were the net result of the overall 0.81% increase required by the 2009 valuation (0.86% for Group 5) and an adjustment to ensure that each group's contribution rate was in line with its theoretical costs. The adjustment for Groups 1 and 4 were an increase of 0.12% of salary (i.e. total increase of 0.93% = 0.81% + 0.12%), while the Group 2 and Group 5 adjustment was a reduction in the rate of 1.52% of salary (i.e. Group 2 net decrease of 0.71% = 0.81%-1.52%, Group 5 net decrease of 0.66%=0.86%-1.52%). There was no adjustment for Group 3.

III. Actuarial Methods and Assumptions

1. Financing Method and Adequacy of Contribution Rates

(a) Funding Criteria

In any pension system, the rates of member and employer contribution should be such that:

- The present value of all future contributions at those rates
- **equals** the present value of all future benefits
- **minus** the funds on hand.

There are numerous financing methods that will satisfy this equation. At one end is the pay-as-you-go or current disbursement method; under this method, contributions are limited to those necessary to finance current benefit disbursements, so that no assets are accumulated. At the other end is the achievement of full funding within a reasonable period; this results in the accumulation of substantial assets.

The general criteria we use in establishing the appropriate level of contributions to the Municipal Pension Plan include:

1. **Benefit security** - the probability of fulfilling the current benefit promises provided in the Plan depends on a mixture of political, economic and financial factors; but, whatever the probability, it is clear that benefit security is enhanced with a larger accumulation of assets.
2. **Stability of contributions** - the financing system should result in contribution rates that are relatively stable over an extended period of time.
3. **Allocation of costs** - as far as is practicable, pension costs should be allocated to the generation that incurs them; there is no assurance that future generations will assume the burdens transferred to them by prior generations.

The Board has adopted a formal funding policy (most recently revised on March 26, 2013) in which it established that its overall goal for basic benefits is the long term sustainability of the fund. The funding policy further identifies benefit security as the primary objective and stability of contributions as an important secondary objective. We have taken this into account in carrying out this valuation.

(b) Indexing Treatment

The current financing provisions are described in Appendix A. Member and employer contributions are at rates set out in the Plan rules. A larger part of these contributions is allocated to the Basic Account, and a smaller portion to the IAA. The future indexing of pensions is based on funds available in the IAA, which

derives its funds primarily from these allocated contributions, from excess investment earnings on pensioner liabilities in the Basic Account, and from investment earnings within the IAA itself.

In a sense, the IAA operates akin to a defined contribution or money purchase liability in that the values of indexing benefits is limited to the assets in the IAA. Future cost-of-living adjustments are not guaranteed, but are granted at the discretion of the Board, subject to the availability of funds in the IAA. The indexing adjustment may not exceed the annual increase in the Canada Consumer Price Index (CPI) as at the previous September 30. If an indexing adjustment is provided, the mechanics are such that the capitalized value of the indexing granted is transferred from the IAA to Basic, each time indexing is granted: the amount of indexing is therefore limited by the monies available in the IAA. Thus, the system will limit indexing, if necessary, so that indexing granted does not increase an unfunded liability, or reduce an actuarial surplus. Accordingly, we did not consider any future indexing in determining the financial status of the Basic Account.

However, we also show supplementary results on the assumption that the assets of, and future contributions to, the Basic Account and the IAA are combined, with benefits to be fully indexed and funded in advance, as for basic benefits.

(c) Retirement Annuity Account

In considering the fund assets for valuation purposes, we excluded the Retirement Annuity Account. This account holds member voluntary contributions as well as other balances in respect of special agreements with various employers that are accumulated on a money-purchase basis and may be converted at a member's retirement into additional amounts of pension. We excluded these assets from our valuation together with corresponding actuarial liabilities, on the assumption that any pension purchases for retiring employees from time to time will have a neutral effect on the Basic Account.

(d) Basic Account Valuation - Current Financing

We determined the financial status of the Plan for the Basic Account only (i.e. ignoring the indexing granted after December 31, 2012). The methods used are described in Appendix B.

(e) Funding Requirements

The approach taken in this valuation (set out in the following sections) has taken into account the requirements of the Board's funding policy, as well as the requirements of the Joint Trust Agreement.

(f) Normal Cost and Amortization of Surplus or Unfunded Liability

An entry-age funding approach is used. As a first step, contributions are calculated as the level, long term percentage rate required to finance the benefits of new entrants to the Plan over their working lifetimes, so that their projected benefits are fully secured by equivalent assets by the time they retire (the "normal cost

rate" or the "entry-age rate"). Thus, to the extent actuarial assumptions are realized, the addition of new entrants to the Plan should not generate either unfunded liabilities or surpluses.

Next, the funded position of the plan at the valuation date is considered. The liability takes into account benefits earned to the valuation date as well as benefits expected to be earned for future service by existing members. Asset values are taken at smoothed market values for existing assets, plus projected future contributions in respect of the existing members at the entry-age normal rates, plus the value of the amortization amounts established at previous valuations. The resulting net financial position may be either an actuarial surplus or an unfunded actuarial liability. This surplus, or unfunded liability, is amortized over a specified period as outlined in the funding policy, e.g. 25 or 15 years. Contributions, expressed as a percentage of salaries, revert to the normal cost rate after the unfunded liability or surplus has been amortized.

(g) *PBSA* Requirements

The *Pension Benefits Standards Act* imposes certain minimum funding requirements on pension plans registered in British Columbia. These include the determination of a plan's financial position on a solvency basis in addition to the going-concern basis, the amortization of unfunded actuarial liabilities over a maximum of 15 years from when they are established, and special rules regarding the treatment of surplus. While the Municipal Pension Plan is one of a number of British Columbia public sector plans that are exempt from these provisions, the current joint trusteeship arrangement requires that the Plan's financing comply with the *PBSA* requirements for a going-concern valuation. This report therefore complies with the going concern funding requirements of the *PBSA*.

(h) Test Contribution Adequacy

Under the *PBSA* going-concern requirements, the employers and the members must contribute the full normal actuarial cost (e.g. the "entry-age rate" described in (f) above). In addition, unfunded liabilities must be amortized over not more than 15 years from when they are established.

Surpluses may be applied to reduce the contribution requirements but, with respect to the employer share of contributions, only after a surplus margin of 5% of liabilities has been set aside, with the remaining surplus to be amortized over not less than 5 years.

Section 11.5(b) of the JTA requires the Board to use a 25 year period for the amortization of a surplus when considering its application towards benefit improvements without the prior approval of the Plan's partners, in order to provide a measure of contribution rate stability. Appendix B of the JTA also specifies a 25 year surplus amortization period when implementing the contribution and benefit changes contemplated during the transitional period.

The plan is still within the JTA transitional period. Accordingly, we have calculated theoretical contribution requirements as follows:

- Calculate the "normal cost rate" (i.e. the "entry-age rate")
- Calculate the surplus (or unfunded liability) using this rate, after taking into account the value of additional contributions required to amortize unfunded liabilities identified at previous valuations.
- If there is an unfunded liability, amortize the balance over 15 years from the current valuation date. If there has been a gain since the last valuation, i.e. the currently scheduled amortization rates applied for the balance of the previously established amortization periods are more than sufficient to amortize the previously identified unfunded liabilities; apply the gain to amortize or reduce the previously identified unfunded liabilities, starting with the oldest established. This results in a reduction in the required amortization rates, with the revised rates in effect for the previously established periods; and
- If, after removing all previously established amortization amounts there is a surplus, amortize it over a 25 year period, after first allowing for the cost of the transitional period benefit improvements. If the resulting amortization requirements allow the employer and member contribution rates to be rebalanced, then the benefits will be improved and contribution rates rebalanced.
- The foregoing rates are, of course, subject to being compatible with the *PBSA* going concern minimum funding requirements.
- The JTA rules require any contribution rate increases to be shared equally by the Plan members and the employers. The JTA transitional arrangements require that contribution rate decreases be applied so as to equalize member and employer contribution rates at the member rates in effect prior to the 2003 valuation (the employers will continue to pay the excess costs for Groups 2 and 5 members). Simultaneously, benefits must be improved in specified ways (see Appendix A). The transitional period is over once these conditions are met and there is sufficient surplus to allow the transfer of $500 million to the IAA and to set up a $500 million rate stabilization reserve in the Basic Account. The intent is that once transition requirements are met, future costs will be shared equally between members and employers. Thus, we express the future cost requirements as a combined member-plus-employer amount.

(i) Eliminate "Doubling" Feature

The employer contribution rates are currently on a partly "doubling" basis. Under this method, the prescribed rate in effect prior to the contribution rate increase following the 2003 valuation applies when a member is below age 50 (for Groups 1 and 4 members) or age 45 (Groups 2 and 5 members); at ages above these, double the stated rates apply. Any increases in the employer rate following the 2003 valuation and subsequent valuations are on a level basis, i.e. the increase is the same regardless of member age. As

described above, the JTA provides for rebalancing of member and employer contribution rates during a transition period, subject to the availability of surplus sufficient to provide for both the rebalancing of contribution rates and specified benefit improvements, at which time the employer "doubling" feature will be eliminated. Thus, we have calculated all of the theoretical long-term costs assuming the doubling feature is removed. To facilitate a comparison with the current employer rates, we also show the current rates on an equivalent level, i.e. non-doubling, basis, based on the salary distribution at the valuation date.

2. Actuarial Assumptions

The rates of investment return, salary increase, indexing, mortality, withdrawal, disability and retirement experienced by members of the fund were examined for the three year period ending on the valuation date, together with corresponding experience for earlier periods and with other assumptions affecting the valuation results. We discussed the implications of the assumptions, and changes to them, with the Board.

Following discussions with the Board, we left the economic assumptions unchanged; we made some adjustments to the demographic and other assumptions. The assumptions are discussed in detail in Appendix B; the key economic assumptions are summarized below.

- Annual Investment Return - 6.50% (unchanged from the previous valuation);
- Annual Salary Increase - 3.75%, plus seniority (unchanged from the previous valuation);
- Annual Indexing - 0.00% for basic costs, 3.00% for indexed costs (unchanged from the previous valuation).

Emerging experience differing from the assumptions will result in gains or losses which will be revealed in future valuations.

3. Membership Data

Data as of December 31, 2012 were prepared by the Pension Corporation. The data are described in detail in Appendix B and numerically summarized in Appendices C, D and E.

4. Benefits Excluded

We have allowed for the medical premium assistance carved out on a pay-as-you-go basis from employer contributions to the Basic Account (and paid through the Supplemental Benefits Account) by treating these as an on-going addition to the administration expenses. This implicitly assumes that the pay-as-you-go costs for this benefit will not change.

With respect to the indexed valuation results, we have reduced the employer contributions to the IAA to 0.2% (for group 1, 2 and 4) and 0.62 (for group 5) of salaries on the assumption that 0.8% of salaries, the maximum set by the Board, will be allocated to post-retirement group benefits. We have not otherwise considered the liabilities and the financing of these benefits.

IV. Results of Actuarial Valuation

The presentation format of the results has been amended since the December 31, 2009 valuation report. The change in presentation does not alter the approach to setting the contribution rates, or the funded position on which the contribution rate recommendation is based. See Appendix H for further details.

1. Basic Account - Actuarial Position

Schedule 1 shows a statement of the actuarial position of the Plan as at December 31, 2012. This statement ignores liabilities for future indexing, and their financing, and assumes that member and employer contribution rates for basic pensions will be made at the entry-age normal cost rate i.e. 15.37% of salary, plus the previously established amortization amounts totaling 2.81% (and an additional 0.23% for Group 5 only) of salary currently scheduled to expire in 2018 and 2024.

Schedule 1 - Statement of Actuarial Position as at December 31, 2012

Basic Account - Non-Indexed Benefits – Entry-age Normal Cost

	($000's)	
Assets	**2012**	**2009**
Market Value of Basic Fund	26,145,681	20,363,772
Asset Smoothing Adjustment	(1,327,270)	1,050,888
Smoothed Value of Fund	**24,818,411**	**21,414,660**
Actuarial present values of:		
▪ Future contributions at entry-age rates	11,110,009	9,707,806
▪ Present value of existing amortization		
• 1.06% to 2018 (from 2003 valuation – amended in 2006)	519,972	675,242
• 1.75% to 2024 (from 2009 valuation)	1,592,191	1,728,393[1]
• Group 5 additional amortization – 0.23% to 2024	7,140	
Total Assets	**38,047,723**	**33,526,101**
Liabilities		
Actuarial present values for:		
▪ Pensions being paid	11,411,717	8,900,555
▪ Inactive members	1,777,817	1,590,832
▪ Active members	25,635,315	22,579,260
▪ Future expenses	593,197	455,454
Total Liabilities	**39,418,046**	**33,526,101**
Surplus (Unfunded Actuarial Liability)	**(1,370,323)**	**0**[1]
Funded Ratio: Total Assets ÷ Total Liabilities	**96.5%**	**100.0%**[2]

[1] The 2009 report showed a $1,728,393 thousand unfunded liability, on the entry age basis, after taking into account the present value of then currently existing amortization requirements of $675,242 thousand. When amortized over 15 years (to 2024) this resulted in an amortization requirement of 1.75%. Showing the amortization requirement as an asset, as it is now part of the required contribution rate, reduces the unfunded liability to zero.

[2] Prior to allowance for the 2009 amortization requirement of 1.75%, the 2009 funded ratio was 94.8%.

2. Change in Actuarial Position

The statement of actuarial position included in Schedule 1 indicates that a new unfunded liability of $1,370 million has emerged since December 31, 2009. The $1,370 million new unfunded liability is the net result of a number of items, the most significant being lower than assumed investment returns, lower than assumed contributions and changes in the valuation assumptions, offset by lower than assumed salary increases.

Schedule 2 - Change in Actuarial Position

		Approximate effect on surplus ($ millions)
1.	Surplus as at December 31, 2009	0
2.	Actual income from investments lower than 6.5% assumed rate (on smoothed values)	(1,716)
3.	Actual contributions lower than previously assumed[1]	(303)
4.	Actual salary increases to December 31, 2012 lower than previously assumed	1,004
5.	Changes in valuation assumptions	(406)
6.	Mortality lighter than previously assumed	(75)
7.	Retirement experience gain	75
8.	Other factors (a net loss) including changes in plan membership and other differences between actuarial assumptions and actual experience during the intervaluation period	51
9.	Surplus (Unfunded Liability) at December 31, 2012	(1,370)

The $406 million loss due to changes in actuarial assumptions (item (5)) is the net result of the following (the assumption changes are described in Appendix B):

Change in Actuarial Position Arising from Change in Actuarial Assumptions

Assumption changes		**Approximate effect ($ millions)**
▪	Benefit assumed chosen on pre-retirement death[2]	(31)
▪	Pre-retirement mortality	0
▪	Disability incidence rate	1
▪	Disability recovery rate	(10)
▪	Withdrawal rates	(8)
▪	Retirement rates	63
▪	Post-retirement mortality	(369)
▪	Post-retirement mortality for disabled pensioners	(29)
▪	Percentage of part time members	(23)
Total loss due to assumption changes		**(406)**

[1] This arises for two reasons. Firstly, the contribution rate increase calculated in the 2009 valuation is assumed to occur at the valuation date, while in fact it occurs 18 months after the valuation. Secondly, the amortization payments received since the last valuation are lower than expected due to the payroll increases being lower than assumed.

[2] Prior valuations assumed that the spouses of members dying prior to retirement, but after the age of 55, would take the default death benefit. Considering the fact that spouses could waive this benefit and thereby obtain a higher benefit, based on the commuted value of the pension earned to the date of death, to be paid to the member's estate, caused us to review this assumption and assume that the more valuable benefit would be chosen.

3. Adequacy of Contribution Rates

As discussed previously in Section III, the required contribution rate consists of the normal cost plus an adjustment to amortize any surplus or unfunded liability. These components of the required contributions are discussed in more detail below.

(a) Normal Cost Rate

The average current service contribution, including contributions by the members, required to finance the basic pensions of new entrants (i.e. the normal actuarial cost) has increased from 15.00% of salaries as at December 31, 2009 to 15.37% of salaries as at December 31, 2012. The 0.37% increase in the average normal cost rate is developed in Appendix F and is the net result of a number of items, the most significant being:

- the change in the mortality assumption (net increase of 0.15%);
- the change in the administration expense assumption (cost increase of 0.10%); and
- the change in the new entrant demographic profiles (cost increase of 0.09%).

(b) PBSA Minimum Rate

Since the Plan has an unfunded liability, the *PBSA* going concern funding requirements must be applied in calculating the required contribution rate. The *PBSA* requires that any previously established unfunded liabilities continue to be amortized over the remaining balance of their 15 year terms at the rate originally calculated when the unfunded liability was established. Any unfunded liability remaining after the existing amortization requirements are taken into account must be amortized over 15 years. If there is a surplus after the existing amortization requirements are taken into account, the existing amortization rates may be reduced, starting with the oldest established.

The present value of the amortization requirements identified in 2003 and payable since 2006[1] at a rate of 1.06% of salaries until 2018, the amortization requirements identified in 2009 and payable at a rate of 1.75% of salaries until 2024, and the additional amortization rate of 0.23% for Group 5 members only and due until 2024 is $2,119,299,000. After taking this into account, there is a remaining unfunded liability balance of $1,370,323,000. Amortizing this over 15 years results in an additional amortization requirement of 1.25% of salaries. Adding these amortization requirements results in a total amortization requirement of 4.06% of salaries for Group 1, 2 and 4 members and 4.29% of salaries for Group 5 members.

[1] In 2003 the amortization requirement was 1.25% of salaries. Following the 2006 valuation, this was reduced to 1.06% of salaries as the original rate exceeded the PBSA requirement.

The minimum *PBSA* requirement is therefore equal to the normal cost of 15.37% plus the amortization requirement of 4.06% (Groups 1, 2 and 4) and 4.29% (Group 5) for a total average contribution rate of 19.44% of salaries (integrated).

The current contribution rates, the contribution rates for current service (on an entry-age basis, i.e. the normal actuarial cost) and the amortization of the resulting unfunded liability are summarized in Schedule 3. Any increase in contribution rates must be shared equally between members and employers; any surplus will first be applied as set out in the transitional arrangements of the Joint Trust Agreement. After transition any further decreases will also be shared equally.

Schedule 3 - Current and Required Basic Contribution Rates

		Based on without tax limit valuation results as at December 31					
		2012 (%)			2009 (%)		
	Current contribution rates[1, 2]	**Member**	**Employer**	**Total**	**Member**	**Employer**	**Total**
1	Group 1	8.30	9.10	17.40	7.49	8.04	15.53
2	Group 4	8.30	9.61	17.91	7.49	8.57	16.06
3	Group 2	8.30	12.75	21.05	7.49	13.09	20.58
4	Group 5	9.82	13.74	23.56	n/a	n/a	n/a
5	**Average**	**8.35**	**9.70**	**18.05**	**7.49**	**8.71**	**16.20**
	Entry-age normal cost rates[1]						
6	Group 1[3]			14.79			14.45
7	Group 4[3]			15.24			14.98
8	Group 2			18.18			17.86
9	Group 5			21.01			20.66
10	**Entry-age normal cost - Average**			**15.37**			**15.00**
	Amortization of unfunded actuarial liability (surplus)						
11	15 year amortization			3.18			2.44
	PBSA amortization						
12	• to 2018			1.06			1.06
13	• to 2024			1.75			1.75
14	• to 2027			1.25			
15	**Total PBSA amortization** (=12+13+14)			**4.06**			**2.81**
16	Additional Group 5 amortization (to 2024)[3, 4]			0.23			0.23
	Total contribution rate[1]						
17	15 year amortization – Average			18.56			17.44
	PBSA minimum rate basis[4, 5]						
18	Group 1 (= 6+15)			18.85			17.26
19	Group 4 (= 7+15)			19.30			17.79
20	Group 2 (= 8+15)			22.24			20.67
21	Group 5 (= 9+15+16)			25.30			23.70
22	**PBSA minimum rate - Average**			**19.44**			**17.81**
23	**Required Contribution Rate Increase – Average**			**1.39**			**1.61**

[1] Less 1.5% of salary up to the YMPE (for each of the members and the employers).

[2] The current rates are shown on an equivalent "non-doubling" basis, based on current payrolls.

[3] The average group 1&4 entry age normal cost is 15.09% (14.81% at 2009).

[4] This amount was established at the 2009 valuation to allow for the fact that members transferring from Group 2 are older than the assumed entry age to Group 5 and therefore the value of their future contributions at the entry age rate is less than the value of the corresponding future liability. This amount amortizes the shortfall over 15 years.

[5] The total contribution rate to the plan needs to comply with the PBSA requirements. The PBSA does not apply at the group level.

The above results indicate a total required contribution rate of 19.44% of salaries, compared to the current rate of 18.05% of salaries, i.e. the current rate must be increased by 1.39% of salaries over its current level.

4. Revised Contribution Rates

Section 10.3 of the JTA requires that the Plan's financing comply with the *PBSA* going concern funding requirements. It also indicates that a contribution rate increase in the Basic Account must be shared equally between members and employers.

As discussed above, current rates need to be increased by 1.39% of salaries. After dividing by two and rounding, the required increase is 0.7% of salaries each for the members and the employers, or a total increase of 1.40%.

The IAA contribution rates are not revised as a result of the valuation and therefore continue unchanged at their current level.

The following table summarizes the current and required contribution rates.

Schedule 4 - Current and Required Total Contribution Rates

<table>
<tr><th rowspan="2"></th><th colspan="5">Current (%)</th><th colspan="5">Required (%)</th></tr>
<tr><th colspan="2">Basic[1]</th><th>IAA</th><th colspan="2">Total[1]</th><th colspan="2">Basic[1]</th><th>IAA</th><th colspan="2">Total[1]</th></tr>
<tr><td>Members</td><td colspan="2"></td><td></td><td colspan="2"></td><td colspan="2"></td><td></td><td colspan="2"></td></tr>
<tr><td>Groups 1, 2, 4</td><td colspan="2">8.30</td><td>1.00</td><td colspan="2">9.30</td><td colspan="2">9.00</td><td>1.00</td><td colspan="2">10.00</td></tr>
<tr><td>Group 5</td><td colspan="2">9.82</td><td>1.42</td><td colspan="2">11.24</td><td colspan="2">10.52</td><td>1.42</td><td colspan="2">11.94</td></tr>
<tr><td rowspan="2">Employers</td><td colspan="2">Doubling age</td><td rowspan="2"></td><td colspan="2">Doubling age</td><td colspan="2">Doubling age</td><td rowspan="2"></td><td colspan="2">Doubling age</td></tr>
<tr><td>Below</td><td>Above</td><td>Below</td><td>Above</td><td>Below</td><td>Above</td><td>Below</td><td>Above</td></tr>
<tr><td>Group 1</td><td>6.82</td><td>11.72</td><td>0.20</td><td>7.02</td><td>11.92</td><td>7.52</td><td>12.42</td><td>0.20</td><td>7.72</td><td>12.62</td></tr>
<tr><td>Group 4</td><td>7.32</td><td>12.72</td><td>0.20</td><td>7.52</td><td>12.92</td><td>8.02</td><td>13.42</td><td>0.20</td><td>8.22</td><td>13.62</td></tr>
<tr><td>Group 2</td><td>8.78</td><td>17.28</td><td>0.20</td><td>8.98</td><td>17.48</td><td>9.48</td><td>17.98</td><td>0.20</td><td>9.68</td><td>18.18</td></tr>
<tr><td>Group 5</td><td>10.30</td><td>18.80</td><td>0.62</td><td>10.92</td><td>19.42</td><td>11.00</td><td>19.50</td><td>0.62</td><td>11.62</td><td>20.12</td></tr>
</table>

[1] Integrated.

***Income Tax Act* Requirements**

Under the *ITA*, there is a requirement that individual member contributions may not exceed the lesser of:

(a) 9% of salary, or

(b) $1,000 plus 70% of the member's pension credit

although these conditions may be waived by the Minister of Finance provided that the contributions are "determined in a manner acceptable to the Minister and it is reasonable to expect that, on a long-term basis, the aggregate of the regular current service contributions made under the provision by all members will not exceed ½ of the amount that is required to fund the aggregate benefits in respect of which those contributions are made".

For Groups 1, 2 and 4, the required member contribution rate of 8.50% of salary up to the YMPE and 10.00% of salary above the YMPE exceeds the 9% limit for members earning more than $76,650 in 2013, so it will be necessary to apply to the Minister for an exemption. The required employer contributions, on an equivalent non-doubling basis, are 10.37% for Groups 1 and 4 and 13.65% for Group 2 (including net IAA contributions of 0.20%). Both exceed the member contributions of 10.00%. As IAA contribution rates are fixed and any future Basic contribution rate changes arising from future valuations will be shared equally in terms of the JTA, the requirement that the member contributions will not exceed half of the amount required to fund the aggregate benefits is met.

The member contributions for Group 5 exceed 9% of salary for all members (11.94% of salary integrated) and thus a waiver is required for these contributions. The corresponding Group 5 non-doubling employer contribution rate of 15.06% (Basic contribution = 14.44% plus net IAA contribution of 0.62%) is higher than the current member rate, and, per the Joint Trust Agreement, the employer contributions to Group 5 can never be less than the member contributions. It is therefore reasonable to conclude that the requirement that the member contributions will not exceed half the amount required to fund the aggregate benefits is met. A similar exemption was required, and obtained, following the 2009 valuations.

Contribution Rate Imbalance

Schedule 4 shows the adjustments that are needed to current rates if all current rates increase equally by the overall required increase of 1.4% of salary. While these adjustments produce the required contributions on average, there are differences between these contribution rates and the underlying theoretical costs by employer group.

The table below shows the current level (i.e. non-doubling) equivalent costs paid for Groups 1, 4, 2 and 5, and the average across the four groups, as well as each group's share of the normal cost and amortization.

These rates are "integrated", i.e. each of the member and employer share is reduced by 1.5% of salary up to the YMPE.

Imbalance in Employer Contribution Rates based on Level (i.e. non-doubling) Equivalents

		Group 1 %	Group 4 %	Group 2 %	Group 5 %	Groups 1/4/2/5 Average %
1.	Theoretical rates = total normal cost plus amortization of unfunded liability	18.85	19.30	22.24	25.30	19.44
2.	Rounding adjustment in rate increase	0.01	0.01	0.01	0.01	0.01
3.	Rounded theoretical rates = (1) + (2)	18.86	19.31	22.25	25.31	19.45
4.	Less: Minimum required Members' rate	9.00	9.00	9.00	10.52	9.05
5.	Employers' share of rounded theoretical rates = (3) – (4)	9.86	10.31	13.25	14.79	10.40
6.	Average current employer rate + overall required increase	9.80	10.31	13.45	14.44	10.40
7.	Employer imbalance by group = (6) - (5)	(0.06)	-	0.20	(0.35)	-

The above table indicates that the employer rates for Groups 1, 2 and 5 are "out of balance" in the sense that Group 1 and 5 are currently paying less than their theoretical cost, while Group 2 is paying more. For example, line 7 of the table indicates that while the overall average employer rate needs no adjustment if current rates are increased by 1.4% of salary, the rates are 0.06% (for Group 1) and 0.35% (for Group 5) lower than the theoretically required rate for Groups 1 and 5, whereas the rate for Group 2 is 0.20% higher than the theoretically required rate for Group 2. The Board may wish to rebalance the employer rates by group so as to bring the resulting rates closer to the theoretical requirements. A similar rebalancing exercise was carried out following the 2009 valuation.

5. Transitional Adjustments and Other Plan Changes

Since the valuation does not show a surplus, the Board may not consider any of the other contribution or benefit changes contemplated during the transitional funding period under the JTA.

6. Accrued Benefits - Funded Ratio

This funded ratio is calculated by dividing the Basic Account assets by the total liability for benefits accrued in respect of service to the valuation date. The asset/liability comparison is analogous to that in Schedule 1, except that contributions and benefits in respect of future service for existing members are excluded from the comparison. The results are shown below.

Schedule 5 - Accrued Benefits - Funded Ratio at December 31, 2012

Basic Account - Non-Indexed Benefits

	($000's)	
	2012	**2009**
Fund (Basic Account): smoothed value of assets	**24,818,411**	**21,414,660**
Accrued Liabilities		
- for pensions being paid	11,411,717	8,900,555
- for inactive members	1,777,817	1,590,832
- for active members	13,530,735	11,893,499
Total Accrued Liabilities	**26,720,269**	**22,384,886**
Surplus (Unfunded Liability): for accrued service only	**(1,901,858)**	**(970,226)**
Funded Ratio: Fund ÷ Total accrued liabilities	**92.9%**	**95.7%**

The above schedule indicates that the funded ratio for accrued benefits has decreased from about 95.7% to 92.9%. This is largely for reasons similar to the items in the analysis in Schedule 2, excluding those items related to future contribution rates.

7. Sensitivity Analysis

Sensitivity Analysis under Standards of Practice

The Canadian Institute of Actuaries Practice-Specific Standards for Pension Plans require disclosure of the effect of using a discount rate (investment return) 1.0% lower than that used for the valuation on:

(a) The actuarial present value, at the calculation date, of projected benefits allocated to periods up to the calculation date, and

(b) The service cost or the rule for calculating the service cost between the calculation date and the next calculation date.

The table below shows the impact on the accrued liability as required by (a) and the entry-age normal cost as required by (b) as at December 31, 2012 of a one percentage point drop in the discount rate assumption. All other assumptions were kept unchanged.

Sensitivity – Impact of 1% drop in investment return on Accrued Benefits and Normal Cost

	From 6.5% to 5.5%
Increase in Accrued Liabilities ($000)	$3,669,388
Increase in Entry Age Normal Cost as percentage of salary	2.98%

Sensitivity Analysis for Plan Funding

Given that the plan is funded on the entry-age basis, we have also considered the impact of a one percentage point drop in the investment return assumption on the Basic Account non-indexed benefits consistent with Schedule 1. These figures are summarized in the table below:

Sensitivity – Impact of 1% drop in investment return on Plan Funding

	($000's)		
	6.5%	**5.5%**	**Increase**
Smoothed Value of Fund	24,818,411	24,818,411	0
Actuarial present values of:			
▪ Future contributions at entry-age rates	11,110,009	14,665,536	3,555,527
▪ Present value of existing amortization	2,119,303	2,222,945	103,642
Total Assets	**38,047,723**	**41,706,892**	**3,659,169**
Total Liabilities	**39,418,046**	**46,607,518**	**7,189,472**
Surplus/(Unfunded liability) on entry-age basis	(1,370,323)	(4,900,626)	(3,530,303)
Entry Age Normal Cost – average	15.37%	18.35%	2.98%
PBSA Amortization	4.06%	6.99%	2.93%
Additional amortization for Group 5	0.23%	0.23%	0.00%
PBSA Minimum rate – Schedule 3 – average	**19.44%**	**25.35%**	**5.91%**

8. Supplementary Valuations

Results analogous to those in Schedules 1, 3 and 5 are shown in Appendix G, on the following bases:

- For basic and indexed benefits combined, on the assumption that indexed benefits are to be fully funded, in advance, as for basic benefits;
- For basic only, and basic plus indexed benefits, including only benefits accrued to the valuation date; and;
- Limiting benefits to those permitted under the Income Tax Act; this is done both for:
  - basic benefits only; and for

- basic plus indexed benefits.

The adjustments to the assumptions are discussed in Appendix B. In the indexing calculations, we reduced the employer contributions to the IAA by 0.8% on the assumption that 0.8% of salaries would be allocated to the post-retirement group benefits.

The key results are summarized below:

Schedule 6 - Indexed Benefits (without tax limits)

Funded position	**Basic Only**	**Basic + Indexed**
	($000's)	**($000's)**
Smoothed Value of Fund	24,818,411	29,169,606
Actuarial present values of:		
▪ Future contributions at entry-age rates	11,110,009	15,390,176
▪ Present value of existing amortization requirements		
(i) 1.06% to 2018	519,972	519,972
(ii) 1.75% to 2024	1,592,191	1,592,191
(iii) 0.23% (Basic Only)/0.31% (Basic + Indexed) to 2024 for Group 5 only	7,140	9,624
Total Assets	38,047,723	46,681,569
Total Liabilities	39,418,046	54,077,899
Surplus (Unfunded Liability) including existing amortization	**(1,370,323)**	**(7,396,330)**
Present value of existing amortization (items (i) and (ii) above)	No adjustment needed	(2,112,163)
Surplus (Unfunded Liability) to be amortized over 15 years	**(1,370,323)**	**(9,508,493)**
Contribution Rates (Integrated)	**%**	**%**
Member – revised	9.05	10.07
Employer – revised	10.40	10.61
Total – revised, average	**19.45**	**20.68**
Entry-age normal cost – average	15.37	20.41
Amortization for all members[1]	4.06	8.68
Additional amortization for Group 5 members	0.23	0.31
Total – entry-age basis – average	**19.44**	**29.10**

If assets and liabilities are restricted to accrued service only, i.e. analogous to Schedule 5 earlier, the 2012 surplus (unfunded liability) figures change as follows:

[1] Basic amortization is as required by the *PBSA*; Basic + Indexed amortization is over 15 years.

Schedule 7 – Indexed Accrued Benefits (without tax limits) – Funded Ratio at December 31, 2012

	($000's)	
	Basic Only	**Basic + Indexed**
Assets	24,818,411	29,169,606
Liabilities	26,720,269	36,703,594
Surplus (Unfunded Liability)	**(1,901,858)**	**(7,533,988)**
Funded Ratio	92.9%	79.5%

Pensions Limited to *ITA* Maximums

When the income tax limits on pensions are recognized, the above 2012 unfunded liabilities change marginally.

Schedule 8 – Pensions Limited to ITA Maximums – Basic Only

Basic Only	**Without Tax Limit**	**With Tax Limit**
Surplus (Unfunded Liability)	**$000's**	**$000's**
Entry Age Basis (including scheduled amortization)	(1,370,323)	(1,187,666)
Accrued Service Only (no scheduled amortization)	(1,901,858)	(1,731,512)
Contribution Rate	**%**	**%**
Entry-age normal cost	15.37	15.30
PSBA Amortization	4.06	3.89
Additional amortization for Group 5 members	0.23	0.24
Total	**19.44**	**19.21**

Schedule 9 – Pensions Limited to ITA Maximums – Indexed Benefits

Basic and Indexed	**Without Tax Limit**	**With Tax Limit**
Surplus (Unfunded Liability)	**($000's)**	**($000's)**
Entry Age Basis (including scheduled amortization)	(7,396,330)	(7,147,322)
Entry Age Basis (excluding scheduled amortization)	(9,508,493)	(9,259,485)
Accrued Service Only (no scheduled amortization)	(7,533,988)	(7,299,481)
Contribution Rate	**%**	**%**
Entry Age Normal Cost	20.41	20.32
15 year Amortization	8.68	8.45
Additional amortization for Group 5 members	0.31	0.31
Total	**29.10**	**28.78**

9. Test Maximum Surplus and Contributions for Tax Purposes

Section 147.2(2) of the *Income Tax Act* limits employer contributions that may be made to a plan if there is a surplus and it exceeds a certain amount - the plan becomes revocable if contributions are made when such surplus exists. Since the plan has an unfunded liability on the entry-age basis, this restriction does not apply.

The tax rules also require that employer contributions not exceed the normal cost rate plus amounts necessary to amortize an unfunded liability.

Subsection (c) of Section 147.2(2) of the *Income Tax Act* also provides that the benefits taken into account for the purposes of a contribution recommendation "may include anticipated cost-of-living and similar adjustments where the terms of a pension plan do not require that those adjustments be made but it is reasonable to expect that they will be made".

Indexing at full CPI has been provided since January 1, 1982 under the present Plan terms, and for many years before that under earlier Plan provisions. As discussed earlier, indexing is currently financed on a mixture of a pay-as-you-go basis (from a matching 1% for Groups 1, 2 and 4 and 1.42% for Group 5 member/employer contribution for active members, less employer contributions allocated to post-retirement group benefits), an excess investment return basis (investment return in excess of the valuation assumption is transferred each year from Basic to IAA in respect of pensioner liabilities), and a "terminally-funded" basis (each year the full capitalized cost of any indexing granted is transferred from IAA to Basic). Thus, it is appropriate for purposes of testing the *ITA* 147.2(2) limits to recognize, in advance, the future indexing of pensions for the present Plan membership. On this basis, the valuation results on the fully indexed basis, recognizing the income tax limits on benefits, would apply.

Thus, while the recommended average rate of 20.68% (required rate of Basic Account of 19.45% plus net IAA contribution of 1.2% for Groups 1, 2 and 4 and 2.04% for Group 5) is slightly higher than the 20.32% fully indexed normal cost rate (as shown in Schedule 9), on the premise that it is appropriate for the Plan to recognize future indexing for the purposes of testing the *ITA* contribution limits there is a significant unfunded liability. Amortizing this unfunded liability over 15 years results in a contribution rate of 28.78% (20.32% Entry Age Normal Cost plus 8.45% 15-year amortization and 0.31% additional amortization for Group 5 members only, as shown in Schedule 9). Contributions at this rate, 28.78%, would be acceptable for *ITA* purposes, and in fact for *ITA* purposes the unfunded liability could be amortized even faster, resulting in an even higher acceptable rate. It is therefore clear that the recommended rate is significantly lower than the maximum rate that is acceptable under the *ITA* and therefore, contributions may increase to recommended rates.

We have commented previously (under section 4) on the 9% limit that applies to individual member contributions.

V. Subsequent Events

To the best of our knowledge, there are no material subsequent events that would affect the results and recommendations of this valuation. Any investment experience occurring between the valuation date and the report date, which differs from the assumption made, is not reported on in this valuation report and will be reported on in future valuations.

VI. Actuarial 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.

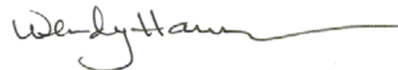
This report has been prepared and our opinions given in accordance with accepted actuarial practice in Canada. Pursuant to the JTA and regulatory requirements, the next valuation should be completed no later than as of December 31, 2015.

VII. Acknowledgement

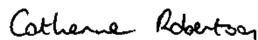
We gratefully acknowledge the generous assistance of the staff of the Pension Corporation in the preparation of the data and other items required for this report.

Respectfully submitted,

Richard A. Border
Fellow of the Canadian Institute of Actuaries[1]
Fellow of the Institute and Faculty of Actuaries



Wendy F. Harrison
Fellow of the Canadian Institute of Actuaries
Fellow of the Society of Actuaries



Catherine Robertson
Fellow of the Canadian Institute of Actuaries[1]
Fellow of the Institute and Faculty of Actuaries

September 23, 2013

[1] Canadian Institute of Actuaries is the Primary Regulator.

Appendix A: Summary of Plan and Amendments as at December 31, 2012

Changes to the Plan

The previous valuation was based on the provisions of the Municipal Pension Plan as at December 31, 2009. Since then, the Plan has been amended a number of times. The main changes are summarized below.

Definition of Firefighter

Effective January 1, 2010, the definition of “firefighter” was amended to mean persons who are employed in the fire sector as firefighters, as a fire chief and any other person employed in, or appointed to, a fire department and assigned to undertake fire protection services which includes fire suppression, fire prevention, fire safety education, communication, training of persons involved in the provision of fire protection services, rescue and emergency services and the delivery of all those services;

Termination of Employment

Effective June 24, 2010, the definitions of “termination of employment” and “termination of membership” were amended to clarify that a member has terminated employment for Plan purposes when the member moves to a position in a class of employees for which their employer has not been approved to participate in the Plan.

Effective November 18, 2010, the definition of “termination of employment” was amended to remove the requirement for a retirement declaration and to ensure that a member who is on layoff, with a right to be recalled to work, is not considered terminated for pension purposes.

Shortened Life Expectancy

Effective November 18, 2010, the Plan Rules were amended by replacing the term “a physical disability” with “a disability or terminal illness” and to clarify the requirements for medical certification and a spousal waiver. The amendments were made to ensure continued compliance with the *Pension Benefits Standards Act* provisions for shortened life expectancy.

Rehabilitation Salaries

Effective November 18, 2010, the Plan Rules were amended to clarify that only rehabilitation program salary earned during an approved group disability period is excluded from the highest average salary.

Termination of Membership

Effective January 1, 2011, the definition of "termination of membership" was amended to reduce the waiting period between termination of employment and termination of membership from 12 months to 90 days.

Contribution Rates

Effective July 1, 2011, the contribution rate to the Basic Account for members and employers increased by 0.81% of salary for Groups 1-4 and 0.86% of salary for Group 5.

Additionally, the Group 1 and 4 employer contribution rates to the Basic Account increased by 0.12% of salary and the Group 2 and 5 employer contribution rates to the Basic Account decreased by 1.52% of salary.

The net increases in the employer contribution rates to the Basic Account for Groups 1 and 4 were therefore 0.93% of salary, for Group 2 a decrease of 0.71% of salary and for Group 5 a net decrease of 0.66% of salary.

Employer Participation

Effective November 25, 2011, following the approval of the "Termination and Modification of Employer Participation Policy", the Plan Rules were amended to: include both voluntary and involuntary employer withdrawals; clarify the Board's ability to impose an obligation to pay fees and expenses upon employers; extend purchase of service application deadlines in certain situations; and clarify the purchase of service rules for arrears.

The amendment also clarified that an active member receiving a benefit from a group disability plan will continue to accrue deemed service if their employer withdraws or modifies its Plan participation or if an employer's group disability plan loses approved status.

Definition of Continuous Employment

Effective March 28, 2012, the Plan Rules were amended to include a definition of "continuous employment" that provides clarity for administration of the optional enrolment provision in the Plan Rules.

The Plan

The main provisions of the Plan as at December 31, 2012 are summarized below. Except as otherwise noted, the section references are to the Plan Rules. The valuation is based on these provisions.

Employer and Employee Eligibility

The Plan applies to employers described under section 2 of the Plan Rules: a municipality, a body designated under the *College and Institute Act*, teaching universities as designated under the *University Act,*

and any other body designated as an employer on terms and conditions of eligibility specified by the Board or former Board. The Board retains the authority to set additional terms and conditions limiting or expanding the employee enrolment requirements applying to the individual employer. In general, Plan employers include municipalities, regional districts, health services organizations, school districts and regional colleges.

Participation is compulsory for all regular, full-time employees and for other employees who have been working in a continuous full-time capacity with the same employer for 12 months. Enrolment is optional for less than full-time employees who have completed at least two years of continuous employment and have earned at least 35% of the Year's Maximum Pensionable Earnings (YMPE) under the Canada Pension Plan in each of two consecutive calendar years. Employees can be enrolled earlier than the Plan requires if the employer passes a resolution or if the terms of a collective bargaining agreement provide for it. Where an active member transfers from the service of one employer to another employer, with a break in service of less than one month, contributions must continue without interruption. [Section 3]

Employees are classified as follows:

(a) Group 1 if male, other than a police officer or firefighter, whose normal retirement age is 65;

(b) Group 2 if a police officer or firefighter, whose normal retirement age is 60;

(c) Group 3 if a female whose last contribution to the fund prior to April 1, 1971 was made as a Group 3 member and who, with the approval of her employer, had elected to remain in Group 3 before November 30, 1971, whose normal retirement age is 60;

(d) Group 4 if a female, other than a Group 2 or 3 member, whose normal retirement age is 65; or

(e) Group 5 if a police officer or firefighter, who has a higher benefit accrual rate and whose normal retirement age is 60. [Section 96(1)].

Member Contributions

Section 5 defines the following contributions (effective July 1, 2011), which are deducted from a member's salary during a calendar year.

For members in Groups 1, 2, 3, and 4:

(a) 6.80% of that part of the member's salary that does not exceed the YMPE (paid into the Basic Account);

(b) 8.30% of the member's salary which is in excess of the YMPE (paid into the Basic Account); and

(c) 1% of the member's entire salary (paid into the Inflation Adjustment Account).

For members in Group 5:

(a) 8.32% of that part of the member's salary that does not exceed the YMPE (paid into the Basic Account);

(b) 9.82% of the member's salary which is in excess of the YMPE (paid into the Basic Account); and

(c) 1.42% of the member's entire salary (paid into the Inflation Adjustment Account).

Member contributions cease after 35 years of pensionable service have been accrued, with the exception of contributions made under certain special agreements entered into under Part 15.

Employer Contributions

Section 6 requires every employer to contribute the following amounts during a calendar year:

(a) for Group 1 members who have not reached age 50, 5.32% of that part of the cumulative salary that does not exceed the YMPE, and 6.82% of that part of the cumulative salary which is in excess of the YMPE; for Group 1 members who have reached age 50, 10.22% of that part of the cumulative salary that does not exceed the YMPE, and 11.72% of that part of the cumulative salary in excess of the YMPE (paid into the Basic Account);

(b) for Group 2 members who have not reached age 45, 7.28% of that part of the cumulative salary that does not exceed the YMPE, and 8.78% of that part of the cumulative salary which is in excess of the YMPE; for Group 2 members who have reached age 45, 15.78% of that part of the cumulative salary that does not exceed the YMPE, and 17.28% of that part of the cumulative salary which is in excess of the YMPE (paid into the Basic Account);

(c) for Group 3 members who have not reached age 45, 5.90% of that part of the cumulative salary that does not exceed the YMPE, and 7.40% of that part of the cumulative salary which is in excess of the YMPE; for Group 3 members who have reached age 45, 11.50% of that part of the cumulative salary that does not exceed the YMPE, and 13.00% of that part of the cumulative salary which is in excess of the YMPE (paid into the Basic Account);

(d) for Group 4 members who have not reached age 50, 5.82% of that part of the cumulative salary that does not exceed the YMPE, and 7.32% of that part of the cumulative salary which is in excess of the YMPE; for Group 4 members who have reached age 50, 11.22% of that part of the cumulative salary which does not exceed the YMPE, and 12.72% of that part of the cumulative salary which is in excess of the YMPE (paid into the Basic Account);

(e) for Group 5 members who have not reached age 45, 8.80% of that part of the cumulative salary that does not exceed the YMPE, and 10.30% of that part of the cumulative salary which is in excess of the YMPE; for Group 5 members who have reached age 45, 17.30% of that part of the cumulative salary which does not exceed the YMPE, and 18.80% of that part of the cumulative salary which is in excess of the YMPE (paid into the Basic Account);

(f) 1% of the member's salary (paid into the Inflation Adjustment Account) for Groups 1, 2, 3 and 4 members; and

(g) 1.42% of the member’s salary (paid into the Inflation Adjustment Account) for Group 5 members.

Employer contributions to the Inflation Adjustment Account are reduced by amounts allocated to post-retirement group benefits [Section 75].

Employer contributions cease in respect of a member's salary after the member has accrued 35 years of pensionable service, with the exception of contributions made under certain special agreements entered into under Part 15.

Termination Benefits

Sections 42(1)(a) and 44 provide for the payment of the member contributions plus interest should the member terminate employment under age 60 (55) with less than 2 years of contributory service. In accordance with section 96, for periods on and after January 1, 1993, and before January 1, 2004, interest credits are based on the average yields of 5 year personal fixed term chartered bank deposit rates, published in the Bank of Canada Review as CANSIM Series B14045. For periods on or after January 1, 2004, interest credits are based on the average yields of 5 year personal fixed term chartered bank deposit rates, published in the Bank of Canada Review as CANSIM Series V122515.

Under sections 42(1) (b) and 45, a terminating member is entitled to a deferred pension equal to the full normal pension accrued to the date of termination. The date the benefit is payable depends on the service accruals to termination – see below "Eligibility Conditions for Pension" section.

Sections 42(1)(c) and 46 provide for the payment of a lump sum commuted value in lieu of the deferred pension, if the member is below age 55 (50), subject to the commuted value being payable on a locked-in basis. Under certain limited conditions (small pensions, non-resident status) the *Pension Benefits Standards Act* (PBSA) permits the election of a lump-sum payout, regardless of age, and on a non-locked-in basis.

Section 100 provides that the deferred vested pension of a terminating member is based on the highest average salary at termination, increased to retirement or to December 31, 1980 if earlier, in accordance with changes in the pension index. Subsequent to 1980, the highest average salary is increased to retirement by the percentage increase granted to pensions for the period between the month of termination and the month the pension becomes effective.

Section 75(3)(h) provides that the cost of the indexing described above is funded from the Inflation Adjustment Account.

Retirement Benefits: Eligibility Conditions for Pension

There are different retirement ages for the five different member Groups in the Plan. The normal retirement age is 65 for members in Groups 1 and 4, and 60 for members in Groups 2, 3 and 5. In the following summary of the various eligibility conditions and Plan provisions, the age and/or service conditions are first shown for Groups 1 and 4; the age and/or service conditions for Groups 2, 3 and 5, if different, are shown in parentheses following the Groups 1 and 4 conditions.

Section 50 provides that an active member who terminates employment is entitled, upon application, to an unreduced pension calculated under section 54, if the member has:

(a) attained age 55 (50) and the sum of the member's age plus years of contributory service is 90 (80) or more; or

(b) attained age 60 (55) with at least 2 years of contributory service; or

(c) attained age 65 (60).

Section 51(a) provides for a reduced pension calculated under section 55(1) if the terminating member has attained age 55 (50) and completed at least 2 years of contributory service.

Section 51(b) provides for a reduced pension calculated under section 55(2) if the terminating member has attained age 60 (55) but has not completed 2 years of contributory service.

Section 13 provides that, under certain conditions, the contributory service requirements mentioned above can include service during certain periods of child rearing (5 year maximum).

Calculation of Unreduced Pension

Section 54 provides that the unreduced lifetime monthly pension payable to a member terminating employment on or after April 1, 2000 in the form of a single life annuity without a guarantee period is calculated as the sum of the following:

(a) 2% of the member's highest average salary multiplied by the number of years of pensionable service accrued before January 1, 1966,

(b) 1.3% of the lesser of

(i) the member's highest average salary, and

(ii) 1/12 of the YMPE for the calendar year immediately before the effective date of the pension

multiplied by the number of years of pensionable service accrued on and after January 1, 1966 not exceeding 35 years, and

(c) 2% of the excess of the member's highest average salary over the amount determined under paragraph (b) (ii), multiplied by the number of years of pensionable service accrued on and after January 1, 1966 not exceeding 35 years.

For the purposes of the above calculation, in respect to any period of pensionable service for which contributions have been made at the rate applicable for Group 5, the percentages referenced in paragraphs (b) and (c) above are 1.63% and 2.33% respectively.

If the member has, before April 1, 2002, purchased pensionable service for service before the date on which the Plan first applied to the member's employer, and has not accrued 35 years of pensionable service after the date that the Plan first applied to the employer, the percentages used in the formula referenced in paragraphs (a) and (b) above for that purchased service are 1.75% and 1.05% respectively.

In addition, the member is entitled to a bridge benefit payable until the earlier of the death of the member or the member reaching age 65 that is:

(a) 0.7% of the lesser of

(i) the member's highest average salary, and

(ii) 1/12 of the YMPE for the calendar year immediately before the effective date of the pension

multiplied by

(b) the number of years of pensionable service on and after January 1, 1966 not exceeding 35 years.

Highest average salary means one-twelfth of the average annual salary earned by a member during the 60 months of pensionable service (not necessarily consecutive) in which the salaries were highest (or, if the member has accrued less than 60 months of pensionable service, the total number of months of pensionable service).

A member who has made voluntary additional contributions in the past - these are no longer accepted - will be granted an increase to their pension or a refund. Members who have contributed under a pre-2007 special agreement will be granted a retirement annuity or a lump-sum payment of the member's account balance. Members who have contributed under a post-2006 special agreement will be granted a lump-sum payment of the member's account balance.

Calculation of Reduced Pension

Where a reduced pension is payable under section 51 to members aged between 55 (50) and 60 (55) who have 2 or more years of contributory service, section 55 provides that the lifetime pension and bridge benefit, described above, are each reduced by a percentage equal to 3% for each year by which the member's age is less than the earlier of age 60 (55) or the age at which the member's age plus years of contributory service total 90 (80) (subsection 55(1)), prorated for fractions of a year.

Where a reduced pension is payable under section 51 to members aged 60 (55) or over who do not have 2 years of contributory service, section 55 provides that the lifetime and temporary pensions, described above, are each reduced by a percentage equal to 3% for each year by which the member's age is less than 65 (60) years of age (subsection 55(2)), prorated for fractions of a year.

If employment terminates under age 50 (45), or between 50 (45) and 55 (50) with less than 10 years of contributory service, the 3% (per year) early retirement reduction factor referred to above is increased to 5% (per year) (subsection 55(3)).

Alternative Types of Pensions

Section 56 provides that a pension may be granted on the single life option with no guarantee period (normal form), single life option with a guarantee period (5, 10 or 15 years), joint life and last survivor option, temporary life annuity option, or a combination of these options upon approval of the plan administrative agent. The amount of any pension granted on a form other than the normal form is calculated on an actuarially equivalent basis.

Where a member has a spouse at retirement, the member is required, as a minimum, to elect that 60% of the member's basic pension be paid on the joint life and last survivor option, unless the spouse waives this requirement in writing or there is a written agreement or court order filed with the plan administrative agent. This option provides for a reduced amount payable to the member, continuing to the spouse on death of the member at 60% of the initial reduced amount. A spouse is as defined in section 96(2).

Disability Benefits

Section 60 provides that a member is entitled, upon application, to a disability pension if the member, before reaching age 60 (55), is totally and permanently disabled, has completed 2 years of contributory service, is not eligible for a monthly income benefit from a group disability plan, has not accepted a lump sum payment in lieu of a continued monthly income benefit under a group disability plan, and has terminated employment. An eligible member is entitled to receive a lifetime pension calculated as the sum of the accrued pension based on the actual service to the date of termination of employment, and 50% of the pension the member would have accrued between the pension effective date and age 60 (55) based on their current salary with service, pro-rated for members who work less than full-time, with both portions not reduced for immediate (i.e. early) retirement. Part 6 outlines the provisions related to disability benefits.

Sections 12(6) and 99(2) provide that if a member is receiving a monthly income benefit from an approved group disability plan, the member and employer do not make contributions and the member is not entitled to a pension under the Plan, but the period for which the member receives such group disability income benefit is considered pensionable service, with the final pension based on the highest average salary at disablement increased to retirement in accordance with changes in the consumer price index. An active member

receiving benefits from a group disability plan continues to accrue deemed service under a group disability plan where an employer withdraws from the plan or the group disability plan loses approved status.

Pre-retirement Death Benefits

The pre-retirement death benefits for active and inactive Plan members are covered in Part 7 as follows:

(a) on death before age 60 (55) with less than 2 years of contributory service, the death benefit is a payment of the member's contributions with interest;

(b) on death before age 55 (50) with 2 or more years of contributory service, without a spouse, the benefit is the full commuted value of the regular pension earned to the date of death (but not less than the value of member contributions with interest). If there is a surviving spouse, then the spouse may choose either the foregoing value or an immediate pension actuarially equivalent to the commuted value and payable as if the member had chosen a 100% joint life and last survivor option;

(c) on death after age 55 (50) with 2 or more years of contributory service (or after age 60 (55) with less than 2 years of contributory service), without a surviving spouse, the benefit is also equal to the full commuted value of the regular pension earned to the date of death (but not less than the value of member contributions with interest). If there is a surviving spouse, then the benefit is an immediate pension to the spouse, calculated as though the member had retired immediately prior to death, with the pension reduced for early retirement as applicable and then converted to a 100% joint life and last survivor option.

If a member terminated employment under the previous vesting and locking-in rules, left contributions on deposit and dies before taking a benefit from the Plan, the service requirement in place at the time of termination (i.e. 10 years or 5 years) is used in place of 2 years of contributory service to determine benefit eligibility.

Cost of Living Benefits (Indexing)

Section 73 sets out how cost of living benefits are to be administered. It provides for increases to retired members on January 1 of each year, with the benefits funded from the Inflation Adjustment Account. The portion of the pension eligible for adjustment is the total amount of the pension, including any previous cost of living benefit, less any portion of the pension that is a result of voluntary contributions (which are no longer permitted). The maximum increase is equal to the percentage increase in the Consumer Price Index (CPI) over the 12 months ending on September 30 of the previous year.

Indexing is not guaranteed. Once granted, an indexing adjustment becomes part of the basic pension. The Board annually considers all relevant factors to determine if indexing will be granted. Future indexing adjustments are granted at the discretion of the Board.

Section 73 sets out additional requirements with regards to the cost of living benefit, including:

(a) the same uniform percentage increase will be granted in respect of all pensions eligible for adjustment;

(b) the increase is prorated if the pension has not been in payment for at least 12 months;

(c) the total capitalized value of all cost of living benefits granted on January 1 must not exceed the amount in the Inflation Adjustment Account on the preceding September 30; and

(d) the capitalized value of all cost of living benefits granted annually is transferred from the Inflation Adjustment Account to the Basic Account.

The Pension Fund

Section 75 provides that the Pension Fund is divided into the following four accounts:

(a) the **Basic Account**, consisting of all the assets in the fund other than assets in the Inflation Adjustment Account, the Supplemental Benefits Account and the Retirement Annuity Account;

(b) the **Inflation Adjustment Account**, consisting of:

(i) the 1% contribution by each of the members under section 5(1)(a)(iii) and the 1.42% contributions by each of the members under section 5(1)b(iii);

(ii) the matching employer contributions under section 6(1)(c) and (d) less amounts allocated for the payment of post-retirement group benefit entitlements;

(iii) the net investment income earned on the Inflation Adjustment Account;

(iv) the income, as determined by the plan administrative agent, that is earned on fund assets held in the Basic Account in respect of pensions being paid and that is in excess of the investment return anticipated in the most recent actuarial valuation; and

(v) amounts transferred to the account from the Retirement Annuity Account under section 75(5)

less:

(vi) amounts transferred to the Basic Account in respect of capitalized cost of living benefits granted under section 73 and 88;

(vii) refunds to Plan members in respect of the 1% contribution made to this account under section 5(1)(a)(iii) and the 1.42% contribution made to this account under section 5(1)(b)(iii), or amounts otherwise transferred out of this account in respect of member and employer contributions allocated to this account;

(viii) amounts determined by the plan administrative agent in respect of the portions of commuted value payments or other transfers out of the Plan that are attributable to cost of living adjustments;

(ix) amounts transferred to the Basic Account that are equal to the capitalized value of increases in deferred pensions resulting from increases in highest average salaries under section 100; and

(x) amounts transferred to the Supplemental Benefits Account to cover inflation protection on benefits in excess of those registrable under the *Income Tax Act*;

(Article 10.3 of the Joint Trust Agreement also permits the Board, subject to the transitional funding arrangements, to transfer portions of any actuarial surplus in the Basic Account to the Inflation Adjustment Account.)

(c) the **Supplemental Benefits Account**, consisting of assets required for the administration and payment of benefits that are non-registrable under the *Income Tax Act,* including post- retirement group benefits; and

(d) the **Retirement Annuity Account**, consisting of voluntary contributions made under the previous statutes, contributions made under special agreements, and investment earnings thereon, less amounts transferred to the Basic Account and the Inflation Adjustment Account for the retirement annuity portion of the benefits paid.

Income Tax Act Limits

The *Income Tax Act* imposes certain limits on the contributions that may be made to, and the benefits that may be paid from, a registered pension plan. However, in total, the contribution requirements from, and the benefit promises to, Plan members have not been altered under the Plan. To this end, the Supplemental Benefits Account covers the financing and payment of benefits in excess of those registrable under the *Income Tax Act*. The excess benefits are paid on a current cash basis, by allocating from the regular employer contributions, the amounts necessary to maintain the Supplemental Benefits Account at a zero balance. Effectively, from a Plan member's perspective, it is expected that these procedures will be invisible – the total contribution and benefit obligations remain unchanged. We have ignored the implications of all such internal restructuring in completing the primary, Basic Account valuation. In the Plan summary herein, and elsewhere in this valuation report, our references to contributions/benefits to/from the Basic/Inflation Adjustment Accounts are inclusive of the allocations to/from the Supplemental Benefits Account; in general, the allocations to/from the Supplemental Benefits Account have not been referenced.

We have also completed supplementary valuations recognizing the income tax limits on pensions. We understand that these limits are applied only in respect of service after 1991. The maximum annual pension permitted at December 31, 2012 (before application of any early retirement reductions, where applicable) is the lesser of:

(i) $2,647 multiplied by the years of service; and

(ii) 2% multiplied by the years of service further multiplied by the average of the best 3 years of remuneration paid to the member.

The Plan also imposes a 35 year cap on accruals at the above maximum rate. The 2013 maximum limit is $2,697 which is increased annually by the increase in the average industrial wage.

Special Agreements

Under Part 15, a special agreement is an agreement entered into by the Board with an employer which provides for employer and member contributions in excess of those required under sections 5 and 6 for the purpose of increasing the benefits of the members employed by the employer. Under the *Income Tax Act* the terms of each special agreement constitute a money purchase provision. [Sections 107 and 108]

Member and employer contributions are made at the rates set in each special agreement, subject to the maximum amounts allowable under the *Income Tax Act*. The contributions are paid into the Retirement Annuity Account and credited to the member's account for whom they are made. The member's account holds the accumulated value of the special agreement contributions made for the member, together with interest at the fund interest rates. Employer contributions immediately vest in the member for whom they are made. A special agreement may require that member and employer contributions continue to be paid after the member has accrued 35 years of pensionable service. Contributions to a special agreement must stop when he or she becomes a member in group 5. [Sections 109 and 110]

Under section 112, a terminating member who elects to receive a refund or commuted value as a termination benefit must be paid a lump sum payment of the member's account balance. If the member does not elect to receive a refund or commuted value as a termination benefit, the member's account remains within the Retirement Annuity Account until the member becomes entitled to a retirement benefit.

Section 113 provides that if a member elects to receive a pension as a retirement benefit, the member is entitled to:

(a) a lump sum payment of the member's account balance under a pre-2007 special agreement, or

(b) a monthly retirement annuity converted from the member's account balance under a pre-2007 special agreement commencing at the same time and payable under the same option and conditions as the pension granted under part 5, and

(c) a lump sum payment of the member’s account balance under a post-2006 special agreement.

If a member qualifies for a disability pension, section 114 provides that the member is entitled to:

(a) a lump sum payment of the member's account balance under a pre-2007 special agreement, or

(b) a monthly retirement annuity commencing at age 60 (55) converted from the member's account balance under a pre-2007 special agreement and payable under the same option and conditions as the pension granted under Part 6, and

(c) a lump sum payment of the member's account balance under a post-2006 special agreement.

If the member elects to receive a monthly retirement annuity but dies before reaching age 60 (55) the member's beneficiary is entitled to a lump sum payment of the member's account balance under a pre-2007 special agreement. If the disability pension continues to the member's spouse, the spouse may choose

either the lump sum payment or an immediate monthly retirement annuity converted from the member's account balance under a pre-2007 special agreement.

Under section 115, if a member dies before taking a benefit from the Plan, the member's beneficiary is entitled to a lump sum payment of the member's account balance. If there is a surviving spouse and he or she elects to receive a pension under Part 7, the spouse may choose either the lump sum payment or an immediate monthly retirement annuity converted from the member's account balance under a pre-2007 special agreement or a lump sum payment of the member’s account balance under a post-2006 special agreement.

Section 117 provides that if an inactive member elects to transfer the member's contributory and pensionable service to another pension plan under a transfer agreement entered into by the Board, the member must be paid a lump sum payment of the member's account balance.

A monthly retirement annuity paid under this Part is paid from the Basic Account as a lifetime pension with a capitalized value equal to the member's account balance at the end of the month preceding the commencement of the annuity. When a monthly retirement annuity commences payment under this Part, the member's account balance is transferred from the Retirement Annuity Account to the Basic Account and the Inflation Adjustment Account and the member's account ceases to exist.

Other Items

1. Article 3.2 of the Joint Trust Agreement provides that all expenses incurred in the administration of the Plan are to be paid from the fund.

2. A maximum of 5 years taken to raise a child may be recognized in establishing eligibility for a pension provided the member has a record of pensionable service immediately before and after the child-rearing period(s). [Section 13]

3. Section 57 enables an employer to request the plan administrative agent to adopt a Special Retirement Incentive Plan (SRIP), whereby the age and service conditions, or the early retirement percentage reductions, or both, may be adjusted. The SRIP must stipulate the eligible members, the period it will remain open, the conditions applicable to the incentives, the additional costs to the employer, the timing of these payments to fund the SRIP and restrictions under the *Income Tax Act*.

4. Effective April 1, 2010, reciprocal transfers between the College, Municipal, Public Service and Teachers’ Pension Plans are made exclusively under the National Public Service Pension Transfer Agreement (NTA). This replaced the Public Sector Transfer Agreement. Under the NTA, transfers under the agreement take into account the benefits under the transferring plans and pro-rate service if the importing plan's reserve requirements are higher than those available from the exporting plan. Members may pay for any shortfall, subject to CRA approval, within certain deadlines. Members can

choose to leave their entitlements with their respective plans and apply for the appropriate benefits available from each plan at termination and/or retirement.

Funding and Transitional Rules

These are covered in Article 10 and Appendix B of the Joint Trust Agreement.

Plan funding must comply with the *PBSA* requirements for a going-concern valuation. Further, if an actuarial valuation indicates a requirement to increase contribution rates to the Basic Account, the increase must be shared equally by members and employers.

The use of emerging surpluses is also limited during a transition period to achieve the following objectives, in the following order:

(a) First, eliminate any unfunded liabilities that existed at a prior valuation;

(b) Next, simultaneously

 (i) rebalance member and employer contribution rates to the Basic Account, such that

  (A) the current doubling feature is removed,

  (B) the employer rates for Groups 1 and 4 members are set equal to the 5.0/6.5% rate for members, and

  (C) the employer rates for Groups 2 and 3 members are also set equal to the foregoing 5.0/6.5% rate plus the differential in the normal cost rates for Groups 2 and 3 vs. that for Groups 1 and 4, as indicated by the actuarial valuation from time to time; and

 (ii) (A) improve the normal form of pension from a single life without guarantee to a single life with a ten-year guarantee, and

  (B) change the benefit formula from 1.3/2.0% to 1.35/2.0%,

 for those who are active members at the date (and active members that join after the date) the improvements are implemented.

The surplus needed for this must be sufficient to stabilize the revised contribution rates on an open group basis, for a 25 year period.

(c) After (a) and (b) are achieved, 50% of any additional or emerging surpluses will be allocated to a contribution rate stabilization reserve and the other 50% transferred to the IAA, until an aggregate total of one billion dollars has been so allocated.

The transitional arrangements do not address Group 5.

The transitional period ends when the foregoing objectives have been achieved.

Appendix B: Actuarial Methods and Assumptions

The significant actuarial assumptions are summarized below.

Investment Return	6.50% p.a. (unchanged from the previous valuation)
General ("across-the-board") Salary Increases	3.75% p.a. (unchanged from the previous valuation)
Seniority Salary Increases	Annual percentages varying by age and sex
CPI Increases	3.00% (unchanged from the previous valuation)
Pension Indexing	▪ Future indexing of pensions and deferred pensions ignored, as will be covered by Inflation Adjustment Account ▪ Future indexing (by inflation) of wage base for disability accruals assumed to be a charge to the Basic Account and to be 3.00% per annum (unchanged from the previous valuation) ▪ Indexing to date is capitalized and forms part of pension liability
Asset Values	▪ Assets carried at smoothed market values ▪ Smoothed value restricted to a range of 90% to 110% of the market value
Costing Method	▪ Contributions are based on an entry-age funding approach

More detail with respect to the above, detail with respect to other assumptions, and comparisons with assumptions and approaches in the previous valuation follow.

1. Actuarial Methods

The plan has been valued on a going-concern basis, which assumes that the plan will continue to operate indefinitely. The basis is used to estimate the funded position of the Plan, and to estimate the contributions required to be made to the Plan's fund.

The methodology used to calculate the valuation liabilities shown in the statement of actuarial position was as follows:

The liability for current pensioners and active members was calculated by projecting the benefit payments to be made to those persons and to their eligible spouses using the actuarial assumptions described below and then discounting these projected payments to the valuation date at the investment return assumption.

The liability for members currently receiving benefits from a long-term disability plan was calculated partly as if they would continue to earn service credits and ultimately receive a pension from the Plan, and partly as if they would again become contributing members of the Plan.

The liability for the inactive group (including those entitled to deferred vested pensions) was calculated on the assumption that a proportion (based on present working status, contribution balance, length of credited

service and date of last contribution) would again become contributing members of the Plan, and a further proportion (based on similar, but different, criteria) would collect deferred vested pensions.

The liability for the remaining inactive members was generally set equal to their accumulated refund values (in some cases, depending on the member's status, we held twice the refund value).

The valuation assets consist of:

(i) The Basic Account;
(ii) The present value of future member and employer contributions at the entry-age normal cost rates, for the closed active group, for the basic non-indexed benefits; and
(iii) The present value of any existing amortization requirements established at previous valuations.

We calculated the required member/employer contribution rate for current service in accordance with the entry-age actuarial cost method, based on the data for those members who joined the plan in the last three years prior to the valuation date and the actuarial assumptions described below. This method produces the level rate of the member/employer contributions sufficient to provide the benefits for the average future new entrants to the plan. The cost so determined is also referred to as the normal actuarial cost and is calculated on an aggregate basis for all entrants as a level percentage of salaries.

Groups 2 and 5 do not have enough new entrants in each group to base the normal cost on; we have therefore used the combined Group 2 and Group 5 new entrant profile in calculating the Group 2 and Group 5 normal cost.

The unfunded actuarial liability is equal to the excess of the valuation liabilities over the valuation assets. If the assets exceed the liabilities, then the difference between them gives rise to an actuarial surplus. Additional payments, in excess of these normal actuarial costs, required to amortize this unfunded liability/surplus were then determined, as a percentage of salaries, as follows:

(1) If the result is an unfunded liability amortize it over the 15 year period commencing January 1, 2013[1]; and

(2) If the result is a surplus (the result of a gain since the last valuation), apply the gain to amortize or reduce the previously identified unfunded liabilities, starting with the oldest established. If, after removing all previously established amortization amounts there is still a surplus, amortize this surplus over 25 years.

In calculating the required contribution rate for Group 5, allowance needs to be made for the fact that initially members will transfer from Group 2 and will therefore enter the group at an age that is older than the assumed entry age. As a result, the value of the future contributions will be less than the value of the future benefits to be earned and there will be an initial unfunded liability. This unfunded liability was taken into

[1] We use an unadjusted 15 year rolling amortization period for the supplementary indexed valuation.

account in the 2009 valuation when calculating the Group 5 contribution rate and was amortized over 15 years from December 31, 2009. We assumed that the same amortization amount will continue for this valuation, payable for 12 years.

As has been done since the 2000 valuation, we report the required costs on a level basis, as opposed to a "doubling" basis.

The required contributions are the sum of the normal actuarial cost and the amount required to amortize the unfunded actuarial liability/surplus.

The actuarial procedures applied in this valuation are substantially the same as those in the previous valuation.

2. Treatment of Member and Pensioner Data

Data as of December 31, 2012 were prepared by the Pension Corporation for 171,647 active members, 71,192 pensioners, 7,076 members receiving benefits from a long-term disability plan, 18,362 terminated members eligible for a vested pension, 14,322 other inactive members (including 15 on leave of absence) plus a further 234 non-retired individuals with very limited data, 31,483 active member terminations and 4,017 pensioner terminations during the period January 1, 2010 to December 31, 2012. The Pension Corporation advised us that the data supplied are generally proper, complete and in accordance with specifications, unless otherwise noted.

Where possible, we compared totals with corresponding details in the Plan's audited Annual Reports. We also subjected the data to a number of tests of reasonableness and consistency, including the following:

- A member's (and partner's, as applicable) age is within a reasonable range;
- A member's gender or date of birth did not change;
- A member joined the plan or commenced pension at a reasonable age;
- Accrued service increased by a reasonable amount (e.g. no more than 36 months since the last valuation and no more than 12 months in the valuation year);
- The salary level and the salary increase from the previous valuation was within a reasonable range;
- Pensions in pay increased by a reasonable amount (e.g. in line with the indexation since the last valuation); and
- We examined the additions to and deletions from each of the data files (i.e., the files for active employees, pensioners and terminated members) since the previous valuation to determine whether

all Plan members were accounted for in this valuation, to check for duplicate records and to confirm pension amounts.

There were a number of discrepancies recorded during our examination of the data and we sought clarification of these from the Pension Corporation. Where necessary, we modified the data, our assumptions, or both, to compensate for these discrepancies.

The active member data includes a number of individuals who work less than full time. For the purposes of calculating liabilities and normal actuarial costs, we treated all members as if they were full-time employees after the valuation date; however, in calculating the amortization costs as a percentage of total future salaries, we reduced the total salary base by 10% to reflect the part-time employment (a 9% adjustment was applied at the previous valuation).

The active member data included 5,210 persons who had no salary or service reported for 2012, or with a last-contribution-date prior to December 2012. We excluded them from the active member base, but have included them with the inactive group. For 1,786 of them (those with at least 3 years of service, contributions after 2010 and an accumulated account of at least $1,500), we held a liability calculated as if they were would be reactivated on January 1, 2013 (we set their salaries equal to the average salaries for active members in the same age-group category). For 1,592 persons (those with an accumulated account of at least $1,500 and 2 or more years of service, but not eligible to be reactivated) we held a liability equal to twice the accumulated account. For the remaining 1,832 persons (i.e. those with an accumulated account of less than $1,500 or less than 2 years of service), we held the accumulated account. We excluded a further 9 active members from the valuation because of missing, invalid or inconsistent detail. Liabilities of twice their accumulated accounts were held for these members. A similar approach was used in the previous valuation.

Salary details were inappropriate (missing, very low, or very high) for a further 245 active members. We assumed that these 245 members had the same average earnings as for other actives in the same age-group category.

There were 769 female members in the active data for Groups 2, 3 and 5. . As in 2009, we did not separate the Group 3 actives, and simply left them with the Group 2 females[1]. We did, however, continue to value the Group 2 females separately from the males, and show a combined figure for the Group 2 members.

The liability for 6,792 of the members on long-term disability was calculated in two steps. We first calculated a liability as if these individuals would ultimately collect deferred vested pensions starting at age 62 for Groups 1 and 4 (unchanged from 2009) and age 57 for Group 2 and 5 (unchanged from 2009) with deferred pensions on the basis of service projected to retirement date (maximum 35 years) and the actual salaries indexed to the valuation date (where the actual salary detail shown for those members was inappropriate, we

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[1] Group 3 has been closed to new entrants since November 30, 1971, and we determined that only 2 of the 769 females had at least 41 years of credited service and could reasonably have been in Group 3.

used the average salaries for active members in the same age-group category). We also calculated a liability as if these members would again become contributing members of the plan. In order to allow for the possibility of recoveries from disability we set the liability equal to 75% of the former figure plus 25% of the latter figure. A similar approach was used in the previous valuation, except the disabled/recovery percentages used were 70% and 30% respectively. We excluded 284 long-term disability members from the valuation because of missing, invalid or inconsistent detail. Liabilities of twice their accumulated accounts were held for these members.

We divided the 18,362 terminated members entitled to a vested pension into two classes:

(i) Those with missing, invalid or inconsistent detail, or whose accumulated accounts were less than $1,500; and

(ii) All other inactive members.

The liability for the first group was held as twice their accumulated accounts. For the second group, we calculated liabilities on the assumption that 100% of these members would receive vested pensions. This approach was unchanged from the previous valuation.

We divided the 14,322 other inactive members into three classes:

(i) Those whose accumulated accounts were at least $1,500, and who are on leave of absence or who have returned to work after the valuation date;

(ii) Those with missing, invalid or inconsistent detail, or whose accumulated accounts were less than $1,500, or who had less than 3 complete years of service, or who did not contribute in 2011 or 2012, or who were known to have taken a refund after the valuation date; and

(iii) All other inactive members.

We calculated liabilities on the assumption that the first and third groups would be reactivated on January 1, 2013, with assumed average salaries equal to the average salaries for active members in the same age-group category, and that the second group would take immediate refunds. For those in the second group with an accumulated account of at least $1,500 and 2 or more years of service, but who were not eligible (under our criteria) to be reactivated we held a liability equal to twice the accumulated account. For the remaining persons in the second group (i.e. those with an accumulated account of less than $1,500 or less than 2 years of service), we held the refund balance. This was unchanged from the previous valuation.

With respect to the 234 remaining non-retired members with limited data, we held a liability equal to their accumulated accounts.

Of the total pensioner data, there were 202 members excluded from the valuation because they died prior to the valuation date with no outstanding guaranteed pensions due, and hence their liability is zero.

The data from the Pension Corporation and our treatment of this data is summarised below. Further details on the active member data, the new entrant groups on which our entry-age costs are based, the inactive member data and the pensioner data are summarized in Appendices C, D and E.

		Valuation Treatment							
	Pension Corp. Data	**Pensioners with zero liability**	**Pensioners**	**Active Members**	**LTD**	**Vested**	**Re-activated**	**Refund CWI[1]**	**Refund 2 x CWI**
Pensioners	71,192	202	70,990						
Active Members	171,647			166,428			1,786	1,832	1,601
Long Term Disability (LTD)	7,076				6,792				284
Terminated Vested	18,362					17,535			827
Inactive members	14,322						22	13,526	774
Limited data	234								234
Total membership	**282,833**	**202**	**70,990**	**166,428**	**6,792**	**17,535**	**1,808**	**15,358**	**3,720**

3. Actuarial Assumptions

Investment return and general salary increase rates

Our actuarial valuation method involves projecting future benefit disbursements and contribution and investment income. In such projections, the most significant assumptions are those that are made for the future rates of return to be earned by the fund and future general salary increases (which are across-the-board increases applying to employees regardless of service, rank or position).

(a) Relationship to excess interest threshold

The investment return assumption is also significant for another reason. Since 1980, the provisions of the plan relating to the indexing of pensions provide that the income to be credited to the Inflation Adjustment Account in respect of pensions being paid is determined by reference to the amount in excess of the investment return anticipated in the most recent actuarial valuation. An increase in the investment return assumption without a corresponding change in the related valuation economic assumptions (such as general salary increases and post-retirement indexing) would have at least two effects:

(i) It would reduce the amount of excess investment return allocated to the IAA, and hence reduce the potential for future indexing; and

(ii) It would reduce the costs of the basic non-indexed plan, provided benefit levels are not changed.

[1] CWI = contributions with interest.

A reduction in the investment return assumption would have the opposite effects. In this context, consistency in the assumptions, from one valuation to the next, takes on added significance.

The previous valuation used a long-term investment return assumption of 6.5% per annum. As noted earlier, this also becomes the threshold rate used to determine excess investment return transfers to the IAA during the post-retirement period; effectively, this is the same as saying that the Basic Account will only earn a rate of 6.5% per annum during the post-retirement period.

(b) Actual returns and asset mix

We have calculated market value returns on the total fund (i.e. Basic plus IAA), including non-invested assets (i.e. receivables, net of payables), net of investment-related expenses, and assuming that all cash flows occur at mid year, as 9.7% for 2010, 3.3% for 2011 and 10.3% for 2012. At December 31, 2012, approximately 61% of the total portfolio was invested in equities (including private placements), a further 16% in real estate, and the balance of 23% in fixed income (including mortgages).

(c) Expected returns

After examining the net average investment return earned by the fund's investments, the yield on investments made in recent years, the likely future trend of investment returns in general, the investment practices, and the provisions of this Plan - e.g. the allocation of excess investment income to the Inflation Adjustment Account - we have concluded that a reasonable best estimate of the long term investment return on the plan's assets is 6.75%. We also concluded that a reasonable best estimate of the real return on the assets, i.e., the investment return in excess of inflation, is 4%.

In setting the valuation assumptions, it is necessary to reduce these expected returns by a margin, so that the resulting liabilities have a suitable provision for adverse deviations. Following discussions with the Board regarding the appropriate adjustments to the best estimate assumptions and taking into account the requirements of the Board's funding policy, for the purposes of this valuation we decreased our long-term investment return assumption to 6.5% per annum. We also continued with our previous valuation assumption for the real return of 3.5%. In other words, there is a margin of 0.25% on the investment return assumption, and a margin of 0.5% on the real return assumption relative to the best estimate assumptions discussed above.

The following table shows the development of the investment return assumption:

	Discount rate
Weighted average return	6.71%
Diversification and rebalancing effect	0.30%
Provision for investment related expenses	(0.25%)
Rounding	(0.01%)
Estimated net investment return before margin	**6.75%**
Margin for adverse deviation	(0.25%)
Discount return assumption (rounded to nearest 0.25%)	**6.50%**

To determine the going concern discount rate, our model determined expected long term capital market returns, standard deviations and correlations for each major asset class by using historic returns, current yields and forecasts. We then stochastically generated projected asset class returns for 1,000 paths over 20 years to create expected returns for each major asset class and applied these to the Plan's target asset mix.

For the purposes of establishing the discount rate used in this report, we have assumed that there will be no added-value returns from employing an active management strategy in excess of the associated additional investment management fees. The investment expense allowance of 0.25% provides for expected future management fees.

(d) Real return and salary relationships - derive salary assumption

The 6.5% investment return assumption used in this valuation was viewed as consisting of a real return component of about 3.5% per annum plus a long-term underlying inflation assumption of about 3.0% per annum. This can also be viewed as a best estimate of future inflation of 2.75% (derived from the best estimate nominal return assumption of 6.75% less the best estimate real return assumption of 4%), plus a margin for adverse deviations of 0.25%.

The general salary increase assumption used in the 2009 valuation was 3.75% per annum. This was viewed as consisting of the underlying inflation assumption of 3.0% per annum, plus a real salary increase component of 0.75% per annum. For this valuation, we continued with the real salary increase assumption of 0.75% per annum and the general salary increase assumption of 3.75%. The real salary increase assumption of 0.75% consists of a best estimate of real salary increases of 0.50%, plus a margin for adverse deviations of 0.25%.

The impact of these assumptions on the valuation result is discussed further below.

(e) Impact of investment return and salary assumptions on valuation

During the **post-retirement period**, the investment return assumption is critical as this is the discount rate for the Basic Account post-retirement liabilities. It also sets the excess investment return threshold which

puts a ceiling on the amounts the Basic Account can effectively earn on the portion of the assets that support post-retirement liabilities. For example, if the threshold is 6.5%, then, provided the long-term returns exceed 6.5% on average, all of the excess will be transferred to the IAA, i.e. the Basic Account will only retain 6.5% on these assets.

During the **pre-retirement period**, it is the relationship, i.e. the net difference, between the investment return and general salary increase assumptions that is the key, rather than their absolute levels - projected benefits increase each year by the salary assumption and are then discounted by the investment assumption, i.e. the net result is that the liabilities are effectively being discounted by the net difference between the two assumptions. For example, the long-term assumptions we have used in this valuation (i.e. 6.5% investment return, 3.75% salary, 3.0% underlying inflation) would produce results similar to those using assumptions of 6.75% investment return and 4.0% salary, with 3.25% underlying inflation; or 7% investment return and 4.25% salary, with 3.5% underlying inflation, etc. Thus, the underlying inflation assumption is not material to the result.

(f) Summary of interrelationships

The 2012 and 2009 annual investment return and general salary increase assumptions, and their underlying economic interrelationships, are summarized below.

	2012 and 2009 valuations
1. Investment return = excess investment return threshold	6.50%
2. Real return rate	3.50%
3. Implied underlying inflation = 1 - 2	3.00%
4. Real salary increase	0.75%
5. General salary increase = 3 + 4	3.75%

(g) Salaries

The 2012 valuation data indicates that average annual earnings increased by about 1.9% from mid-2009 to mid-2012 (i.e. about 0.6% per annum), as compared with an expected increase of about 11.7% (i.e. about 3.75% per annum) on the basis of the assumptions used in the 2009 valuation.

The input data salaries provided to us for this valuation were the actual earnings during 2012. We took them without further adjustment as being equal to the salary rates on the valuation date (this may slightly understate the actual salary rates at the valuation date). Thereafter, the assumed rates of salary increase are applied continuously during each future year.

(h) YMPE increase

We also assumed that the YMPE under the Canada Pension Plan would increase at the general salary increase rate of 3.75% per year from its 2013 level of $51,100, both for the regular valuation and for the purposes of computing the entry-age costs. In the previous valuation we assumed that the YMPE would increase at the same rate of 3.75% per year from its 2010 level of $47,200.

Pension indexing - basic valuation

Indexing adjustments on and after January 1, 1982 are on an annual basis and are limited to those amounts that can be appropriately financed by the balances available in the Inflation Adjustment Account. Thus we do not need to allow for future indexing in our calculations as the costs of this indexing are currently fixed at 1% of salaries to be paid by each of the members and the employers, less amounts paid for post-retirement group benefits for pensioners. With respect to indexing adjustments granted through December 31, 2012, the present values have been included in the actuarial liabilities for pensions in the course of payment and thus form part of the determination of the recommended contribution.

As in the previous valuation, we ignored the future pre-retirement escalation that applies to vested pensions, since the cost of this "indexing" is also charged to the Inflation Adjustment Account.

With regard to the vested pensions of members who have terminated employment, the amounts of deferred pensions quoted to us include indexing during the deferred period to date. We understand that transfers to the Basic Account from the Inflation Adjustment Account to finance this indexing do not occur until retirement (theoretically, such transfers should be made on an annual basis as the indexing occurs, so as to reduce the inter-generational transfer of the costs of such indexing). We have adjusted the deferred pension amounts to remove this indexing, so that the Basic Account Liability is aligned with the allocation of assets between the Basic and IAA accounts. A similar approach was used in the previous valuation.

The indexing of salaries before retirement in the case of members on long-term disability is, on the other hand, a charge to the Basic Account rather than to the Inflation Adjustment Account. Accordingly, in valuing the deferred pensions for those currently on long-term disability, we have made an allowance for this by applying an escalation assumption (at the full underlying inflation assumption) of 3.0% per annum during the deferral period to retirement.

Asset values

The fund's annual reports record assets on a market value basis. We relied on these annual reports for the asset values used for the years ending December 31, 2010 to December 31, 2012.

As in the previous valuations, we have continued to apply a five year smoothing technique to these assets. We believe a smoothing approach is appropriate as it cushions the actuarial valuation results against the dramatic swings in market value which can occur. After discussion with the Board in 2006, it was agreed

that an additional constraint on the smoothed value of assets is appropriate, and that the funding policy be modified to provide that, during the Joint Trust Agreement transitional period, the smoothed value is restricted to a range of 90% to 110% of market value. This constraint was introduced in the 2006 valuation, and we have continued to apply it in the current valuation.

To obtain the unconstrained smoothed value, we first determine the actual return on the basis of market values during the year (taking into account the timing of non-investment related cashflows i.e. the net contributions minus benefits and non-investment expenses). We then determine an assumed return for the year at a rate equal to the assumed underlying real return rate plus the year-over-year change in the consumer price index. The difference between the two returns is then spread over a five year period, recognizing one-fifth of it in each of the current and four succeeding years. This approach effectively spreads the difference between (a) the total investment return (including both realized and unrealized capital changes) and (b) a hypothetical return based on a long-term real return rate, over a five year period.

The smoothed value is then restricted to a range of 90% to 110% of market value, if necessary. This constraint did not apply as of December 31, 2012.

The application of this approach to the total fund yields the following results:

Total Fund Smoothing

	2010	2011	2012
1. Dec-over-Dec increase in CPI	2.4%	2.3%	0.8%
2. Base return = (1) + 3.5%	5.9%	5.8%	4.3%
Year-end asset values - $000's			
3. Market value	27,017,002	28,036,540	31,062,049
4. Smoothed value	27,268,467	28,358,817	29,485,202
5. Ratio of (4) ÷ (3)	1.009	1.011	0.949
Annual returns			
6. Market value	9.7%	3.3%	10.3%
7. Smoothed value	5.3%	3.5%	3.5%

Using the relationship between the market and adjusted values shown in line 5 above, and applying this relationship to the Basic Account and Inflation Adjustment Account balances we get:

Year end asset values - $000's

Basic Account	2010	2011	2012
8. Market value	22,399,937	23,300,660	26,145,681
9. Smoothed value	22,608,428	23,568,499	24,818,411
10. Ratio of (9) ÷ (8)	1.009	1.011	0.949
Retirement Annuity Account			
11. Market value	324,219	320,088	332,474
12. Smoothed value	327,237	323,767	315,596
13. Ratio of (12) ÷ (11)	1.009	1.011	0.949
Inflation Adjustment Account			
14. Market value	4,292,846	4,415,792	4,583,894
15. Smoothed value	4,332,802	4,466,551	4,351,195
16. Ratio of (15) ÷ (14)	1.009	1.011	0.949

Mortality

We examined the 2010-2012 mortality experience and compared this with the experience observed in our previous analyses of the mortality rates and with the rates used in the previous valuation. In general, the actual experience showed fewer deaths than were indicated on the basis of the rates used in the previous valuation. We therefore adjusted the mortality rates to allow for the improvements in mortality of the members as follows:

(a) For active members we assumed 70% for males and 75% for females of the respective rates in the 1994 Group Annuity Mortality Table. The previous valuation used 80% for males and 80% for females of the respective rates in the 1994 Group Annuity Mortality Table.

(b) For members retired on account of disability we used 75% for males and 75% for females of the mortality rates (applicable in 1997) for similar retirees used for the valuation of the Canadian Public Service Superannuation Plan as at March 31, 1996 (that valuation applies mortality improvement factors, on a dynamic basis, to certain base rates). The corresponding assumption in the previous valuation was 80% for males and 80% for females, applied to the same underlying table.

(c) For other retired members, the beneficiaries and spouses of former members, and for active members after retirement, we used 70% for males and 75% for females of the rates of the 1994 Group Annuity Mortality Table. The previous valuation used 80% for males and 80% for females of the respective rates in the 1994 Group Annuity Mortality Table.

Withdrawal

We examined the rates of withdrawal for reasons other than death, retirement or disability over the period January 1, 2010 to December 31, 2012 and compared this with the experience observed and the rates used

for previous valuations. The observed rates for Group 4 were slightly lower than those assumed in the previous valuation, while the observed rates for Group 1 after 3 years of service were slightly higher than assumed in the previous valuation. As a result, we have made modest changes to the withdrawal rates used for the previous valuation, by adopting the following multiples of those rates.

Multiples applied to 2009 Rates

	In the first 3 years of service			After 3 years of service
	1st year	2nd year	3rd year	
Group 1	100%	100%	100%	105%
Group 2 and 5	100%	100%	100%	100%
Group 4	95%	95%	95%	95%

Sample withdrawal rates are shown in the following tables.

A. Withdrawal Rates Applicable in the First 3 Years of Service (these include terminations from all sources, i.e. including death, disability and retirement)

Age at entry	2012 valuation			2009 valuation		
	1st year	2nd year	3rd year	1st year	2nd year	3rd year
Group 1						
20	.155	.143	.119	.155	.143	.119
30	.103	.106	.090	.103	.106	.090
40	.074	.069	.056	.074	.069	.056
50	.067	.056	.041	.067	.056	.041
Group 2 and 5						
20	.026	.022	.021	.026	.022	.021
30	.019	.014	.012	.019	.014	.012
40	.009	.007	.007	.009	.007	.007
Group 4						
20	.128	.135	.120	.135	.142	.126
30	.108	.118	.086	.114	.124	.091
40	.062	.060	.053	.065	.063	.056
50	.062	.060	.041	.065	.063	.043

B. Withdrawal Rates Applicable After 3 Years of Service

Attained age	2012 valuation			2009 valuation		
	Group 1	Group 2 and 5	Group 4	Group 1	Group 2 and 5	Group 4
23	.082	.014	.115	.078	.014	.121
33	.047	.008	.049	.045	.008	.052
43	.025	.005	.029	.024	.005	.031
53	.015	-	.018	.014	-	.019

The withdrawal rates we have used do not extend past 10 years below the normal retirement age for each group.

Disability

The Plan provides for either the payment of a disability pension from the Plan or, for members receiving long-term disability benefits, the continued accrual of pension benefits. We examined the combined experience of members going on disability pensions and on long-term disability and slightly increased the rates for Group 1 from those used in the previous valuation. Since most members receive continuing disability service credits rather than an immediate pension, we have continued to value the disability cost for active members as a deferred pension (indexed before retirement) with continued accrual of service, rather than as an immediate pension. Based on an examination of those now retired who had, prior to retirement, been in receipt of disability service credits, we assumed that the deferred pensions would commence at age 62 for Groups 1 and 4, and at age 57 for Groups 2 and 5 (or immediately, for those older than these ages). The same age 62 and 57 assumptions were made in the 2009 valuation.

Sample disability rates are shown in the following table. No direct allowance is made for the possibility of an individual recovering from disability prior to retirement - the rates used have been reduced from the observed disability incidence to implicitly allow for such recoveries.

Age	2012 valuation			2009 valuation		
	Group 1	Group 2 and 5	Group 4	Group 1	Group 2 and 5	Group 4
25	.0003	.0001	.0002	.0003	.0001	.0002
35	.0004	.0002	.0014	.0004	.0002	.0014
45	.0023	.0010	.0045	.0022	.0010	.0045
55	.0064	.0029	.0125	.0059	.0029	.0125

The rates used for this valuation are 145% for Group 1, 195% for Group 4 and 65% for Groups 2 and 5 of the respective rates used for the valuation of the Canadian Public Service Superannuation Plan as at March 31,

2005. The 2009 valuation used multiples of 135% for Group 1, 195% for Group 4 and 65% for Group 2 and 5 applied to the rates used in the Canadian Pubic Service Superannuation Plan as at March 31, 2005.

Retirement

We examined the 2010-2012 retirement experience and compared this with the experience observed in our previous analyses of the retirement rates and with the rates used in the previous valuation. In general, the actual experience is reasonably consistent with the assumption used in the previous valuation; in most cases, actual experience was slightly lower. We gave partial recognition to the observed experience by adopting modest changes to the rates previously used for retirement.

We slightly reduced most of the rates of retirement for both unreduced and reduced pensions for Groups 1 and 4. The rates of retirement for unreduced pensions at ages 55 and 56 were slightly reduced for Groups 2 and 5, and those at age 59 increased.

The rates used in this and the previous valuation, are as follows:

Normal Retirement Age = 65

Age	Service	2012 valuation		2009 valuation	
		Group 1	Group 4	Group 1	Group 4
For unreduced retirement pensions					
55-59	rule-of-90	.58	.50	.62	.50
60	10	.43	.45	.45	.47
61	10	.23	.23	.23	.25
62	10	.23	.23	.23	.25
63	10	.22	.23	.24	.25
64	10	.28	.30	.31	.34
65	0	1.00	1.00	1.00	1.00
For reduced early retirement					
55-59	at least 10 years, but age plus service add to less than 80	.05	.08	.05	.08
55-59	age plus service add to at least 80	.10	.13	.11	.14

Normal Retirement Age = 60

Age	Service	2012 valuation	2009 valuation
		Group 2 and 5	Group 2 and 5
For unreduced retirement pensions			
50-54	rule-of-80	.18	.18
55	10	.26	.28
56	10	.25	.27
57	10	.30	.30
58	10	.33	.33
59	10	.50	.45
60	0	1.00	1.00
For reduced early retirement			
50-54	at least 10 years, but age plus service add to less than 75	.06	.06
50-54	age plus service add to at least 75	.09	.09

Even though pensions (unreduced and reduced) are available with less than 10 years of service, we have continued to apply the retirement rates before age 65 (60) only to those with 10 or more years of service, on the assumption that those with fewer than 10 years would not retire until the normal retirement age.

Seniority salary scales

Seniority salary increases are in addition to the general salary increases and are intended to reflect increasing seniority, recognition of merit and promotion. We examined the seniority salary scales based both on the earnings history of the active members during the 3 year period ended December 31, 2012 and on the graduated average salaries of the active members as of December 31, 2012, and compared these with the experience observed and rates used in the previous valuation. Based on these investigations we decided to continue with the previous salary scales. Sample earnings rates expressed as a proportion of earnings at the normal retirement age are as follows:

Age	2012 and 2009 valuations			
	Group 1	Group 2 males	Group 2 females	Group 4
25	.731	.659	.766	.723
35	.866	.794	.946	.852
45	.952	.880	.988	.934
55	.992	.960	.997	.987

Proportion of eligible terminating members electing a vested pension

Locking-in of vested pensions occurs after 2 years of service, in respect of all service credits. We have therefore valued all vested terminations as vested pensions. The same assumption was made in the previous valuation.

The balance of the terminating members (i.e. those not vested) are assumed to elect a refund of contributions with interest.

Proportions of members married at death

For this valuation, we assumed that the surviving spouses of all vested members who die after age 55 would opt to take the commuted value of the pension earned to the date of death. Therefore the proportions of members assumed to be married at death are irrelevant for this valuation. In the previous valuation, married members were assumed to have retired at the date of death, electing a 100% joint life and last survivor option, and we assumed that 90% of members would be married at death and that the husband's age would exceed the wife's age by 3 years.

Growth of active Municipal population

We assumed in all the actuarial projections that there would be no future growth or decline in the Municipal population. The same assumption was made in the previous valuation.

Expenses

Administration expenses are paid out of the Municipal fund. Medical premium assistance for pensioners is carved out of the incoming employer Basic Account contributions, and is paid through the Supplemental Benefits Account. We have treated these as an on-going addition to the administration expense. The sum of these two amounts was 0.57%, 0.57% and 0.71% of salaries for 2010, 2011 and 2012 respectively. However, projected expenses provided by the Pension Corporation for the next few years anticipate that administration expenses will continue at the higher rate seen in 2012. Accordingly, we increased the expense provision from 0.60% of salary used in the previous valuation to 0.70% of salary, as part of the normal actuarial costs in the determination of the required contribution rates under the entry-age funding method. We also included a provision for the present value of expenses in the statement of actuarial position. The same approach was used in the previous valuation.

It should be noted that these procedures do not properly value the liabilities for these post-retirement group benefits, i.e. medical premium assistance for pensioners, allocated from contributions made to the Basic Account; they merely include a provision for these costs on a pay-as-you-go basis, over the future working lifetime of the closed active membership.

As before, the investment management fees are excluded from our analysis above and from the expense provision we have made as they are reflected in the long term investment return assumption.

Other items

(1) We continued with the interest assumption used for accumulation and refunds of member contributions to be 1.5% less than the valuation interest assumption, i.e. at 5.0% per annum. This allows for the *PBSA*-related practice whereby the refund interest rate is set equal to an average of 5-year bank-term-deposit rates (which are assumed to be 1.5% less than fund earnings).

(2) *Recognition of child-rearing periods for pension eligibility*: We continued to assume that this would only affect female members, and that, on average, it would increase the member's contributory service (which is used for determining pension eligibility) by 2 years; there would, of course, be no increase to the member's pensionable service (which is used for determining pension amounts). The impact of this would be to reduce the eligibility requirement for unreduced pensions between ages 55 and 59, from a rule-of-90 to a rule-of-88 (Group 4; for Groups 2, 3 and 5 females, at ages 50 to 54, to a rule-of-78), and we assumed that there would be no impact on the eligibility assumptions made for other benefits. The same assumption was made in the previous valuation.

Plan termination

The Standards of Practice issued by the Canadian Institute of Actuaries require that a valuation report "disclose the financial position of the plan if it were to be wound up on the calculation date, unless the plan does not define the benefits payable upon wind-up, in which case the actuary should include a statement to that effect".

Schedule A of the Public Sector Pension Plans Act, which sets out the governing framework under joint trusteeship does not address wind-up, and neither do the plan rules, therefore the benefits on wind-up are not defined. Accordingly, we no longer comment on the financial position of the plan if were to be wound up as we have done in previous valuations.

Fully indexed valuations - assumption changes

We made the following changes to the assumptions when doing the fully indexed valuations:

- We combined the assets in the Basic and Inflation Adjustment Accounts, using a smoothed asset value of $29,169,606,000;
- We applied an indexing assumption equal to the full assumed underlying inflation rate, i.e. 3.0% per annum. This indexing rate was applied both to pensions after retirement and during the pre-retirement period in the case of deferred vested pensions and disability salary accruals. We loaded the pensions in salary by 1.2% to cover the actual January 1, 2013 indexing increase. For active members, our program

applies the indexing on a continuous basis after retirement; for existing pensioners and deferred vesteds, the indexing is applied annually, in arrears; and

- We combined the contribution rates to Basic and IAA, i.e. we assumed a total member contribution rates of 8.3% + 1% = 9.3% for Groups 1 to 4 and 9.82% + 1.42% = 11.24% for Group 5, integrated with the CPP (i.e. reduced by 1.5% of salaries below the YMPE). The employer contributions of 1% for Group 1 to 4 and 1.42% for Group 5 to the IAA were reduced by 0.8% to account for the carve-out of the non-pension (EHB and Dental) benefits. The 0.8% carve-out was based on the Board's funding policy that no more than 0.8% of the employers' IAA contributions (excluding the extra 0.42% contribution for Group 5) would be available to pay for post-retirement group benefits. A similar approach was used in the previous valuation.

ITA maximum pension rule - assumption changes

As noted earlier, we have not applied the *ITA* maximum pension rules when doing the primary Basic and Basic-plus-Indexed valuations. We have applied them, as described below, when doing the supplementary valuations with pensions limited to the *ITA* maximums.

The maximum annual pension currently permitted (in 2013) under the income tax rules is the lesser of:

(i) $2,696.67 multiplied by the years of service; and

(ii) 2% multiplied by the years of service further multiplied by the average of the best 3 years of remuneration paid to the member.

While the Plan applies the *ITA* limits only in respect of service after 1991, we have, for ease of calculation, assumed that this limit applies on all service; this assumption does not affect the future normal costs, but the accrued liabilities will be slightly understated. The Plan also imposes a 35 year cap on accruals at the above maximum rate, which we have applied. For an individual in this Plan to be currently affected by the $2,696.67 maximum the final average salary must be very high and while current salaries are not such as to cause many problems the salaries projected in the future through application of the assumed salary increase rates outlined above are such that some individuals would be limited. However, under the income tax rules, the flat $2,696.67 limit is automatically indexed each year after 2013 in accordance with increases in the average wage. Accordingly, we have applied a 3.75% per annum increase to the $2,696.67 limit after 2013. (At the previous valuation the corresponding dollar limit was $2,494.44 in 2010, and after 2010 was assumed to increase by the average wage increase of 3.75%.)

It should also be noted that, in the tax-limited results, we valued the deferred vested pensions not yet in pay, in full, as provided to us, i.e. we were unable to carve out any "excess" portions. In the previous valuation we also valued the existing pensions in pay in full. Given the changes to the pension administration system, we were able to carve out the pensions in pay in excess of the limits for this valuation.

Appendix C: Active Member Data as at December 31, 2012

Age group[1]	Active members December 31, 2012[2]			New entrants Jan 1, 2010 to Dec 31, 2012 and still active	
	Number	Average annual earnings[3] $	Average service (years)	Number	Average annual earnings[3] $
Group 1 (males - normal retirement age = 65)					
15-19	5	45,623	0.1	30	46,371
20-24	464	47,828	1.1	441	49,626
25-29	2,181	52,928	2.3	934	53,679
30-34	3,541	58,441	3.7	885	57,638
35-39	4,377	62,519	5.2	813	59,282
40-44	5,365	63,314	7.4	650	61,835
45-49	6,335	63,631	10.2	604	61,015
50-54	7,558	63,614	13.1	434	62,928
55-59	6,408	65,157	15.2	298	62,227
60 & over	4,339	64,951	14.2	118	63,864
Total	**40,573**	**62,637**	**9.9**	**5,207**	**58,201**
Group 4 (females - normal retirement age = 65)					
15-19	6	38,051	0.4	77	41,350
20-24	1,527	46,861	0.9	1832	50,432
25-29	8,604	53,344	2.1	2952	52,811
30-34	11,825	57,560	3.4	2010	54,524
35-39	12,920	58,531	4.6	1617	53,694
40-44	15,331	57,815	6.2	1509	51,759
45-49	18,038	56,358	8.3	1216	51,101
50-54	21,303	55,857	10.4	891	52,548
55-59	18,405	56,604	12.3	460	55,505
60 & over	11,115	55,705	12.3	171	56,859
Total	**119,074**	**56,448**	**8.0**	**12,735**	**52,628**
Total Groups 1 & 4	159,647	58,021	8.5	17,942	54,245

[1] Age nearest birthday at December 31, 2012 for actives and at entry for new entrants.

[2] In total, 9 actives excluded because of invalid data; 5,210 actives included with inactive data.

[3] Actual earnings in 2012 for those employed all year and annualized for others. Very low or very high earnings figures were replaced by the average earnings in the same age-group category.

Age group[1]	Active members December 31, 2012[2]			New entrants Jan 1, 2010 to Dec 31, 2012 and still active Groups 2 and 5 combined	
	Number	Average annual earnings[3] $	Average service (years)	Number	Average annual earnings[3] $
Group 2 (males - normal retirement age = 60)[4]					
20-24	16	60,496	1.2	81	62,234
25-29	172	67,347	2.8	229	62,398
30-34	369	73,803	5.0	131	63,819
35-39	450	78,480	8.0	69	66,110
40-44	604	83,076	12.1	25	70,498
45-49	472	90,262	17.5	6	71,072
50-54	454	98,302	22.4	3	89,676
55 & over	253	100,955	25.3	4	79,589
Total males	**2,790**	**85,324**	**13.6**	**548**	**63,920**
Group 2 (females - normal retirement age = 60)[4]					
20-24	0	0	0	7	57,440
25-29	15	70,028	3.0	31	60,537
30-34	33	70,619	3.7	18	61,776
35-39	26	77,455	6.2	11	63,221
40-44	47	80,140	10.6	4[5]	65,275
45-49	30	85,179	13.7	0	-
50-54	25	83,352	14.3	0	-
55 & over	6	65,708	27.9	0	0
Total females	**182**	**77,993**	**9.7**	**71**	**61,229**
Total Group 2	**2,972**	**84,875**	**13.4**	**619**	**63,611**
Total – All groups	**166,428**	**59,193**	**8.7**	**18,561**	**54,558**

[1] Age nearest birthday at December 31, 2012 for actives and at entry for new entrants.

[2] In total, 9 actives excluded because of invalid data; 5,210 actives included with inactive data.

[3] Actual earnings in 2012 for those employed all year and annualized for others. Very low or very high earnings figures were replaced by the average earnings in the same age-group category.

[4] Group 2 data is separated into males and females; female subset includes 2 members with 41 or more years of service who are likely in group 3.

[5] 1 active over 45 included in this group due to privacy.

Age group[1]	Number	Active members December 31, 2012[2] Average annual earnings[3] $	Average service (years) with 2% benefit rate	Average service (years) with 2.33% benefit rate
Group 5 (males - normal retirement age = 60)				
20-24	28	63,308	0.4	1.0
25-29	254	70,817	1.7	1.4
30-34	475	78,165	4.0	1.5
35-39	587	83,285	7.0	1.7
40-44	686	88,414	10.9	1.7
45-49	554	96,164	15.9	1.7
50-54	416	102,427	21.3	1.8
55 & over	222	107,591	24.0	1.8
Total males	**3,222**	**88,826**	**11.5**	**1.7**
Group 5 (females - normal retirement age = 60)				
20-24	3	61,305	0.9	0.5
25-29	74	68,265	1.7	1.2
30-34	82	81,254	5.0	1.6
35-39	109	82,845	7.0	1.5
40-44	148	87,612	11.0	1.6
45-49	109	93,120	14.4	1.7
50-54	43	97,619	18.7	1.7
55 & over	19	92,091	19.7	1.9
Total females	**587**	**85,166**	**9.7**	**1.5**
Total Group 5	**3,809**	**88,262**	**11.2**	**1.7**

[1] Age nearest birthday at December 31, 2012 for actives and at entry for new entrants.

[2] In total, 9 actives excluded because of invalid data; 5, 210 actives included with inactive data.

[3] Actual earnings in 2012 for those employed all year and annualized for others. Very low or very high earnings figures were replaced by the average earnings in the same age-group category.

A comparison of the December 31, 2012 active membership with the December 31, 2009 active membership is as follows:

	Group 1	Group 4	Group 2	Group 5
At December 31, 2012				
- Number	40,573	119,074	2,972	3,809
- Proportion of total	24.4%	71.5%	1.8%	2.3%
- Average age (at 12.31)	46.8	45.9	42.6	41.2
- Average service	9.9	8.0	13.4	12.8
- Average salary	$62,637	$56,448	$84,875	$88,262
At December 31, 2009				
- Number	36,966	107,223	6,602	-
- Proportion of total	24.5%	71.1%	4.4%	-
- Average age (at 12.31)	46.2	45.4	41.3	-
- Average service	10.2	7.9	12.8	-
- Average salary	$61,503	$55,384	$81,863	-
Change 2009 to 2012				
- Number	+ 9.8%	+ 11.1%	- 55.0%	-
- Proportion of total	- 0.1%	+ 0.4%	- 2.6%	-
- Average age	+ 0.6 years	+ 0.5 years	+ 1.3 years	-
- Average service	- 0.3 years	+ 0.1 years	+ 0.6 years	-
- Average salary	+ 1.8%	+ 1.9%	+ 3.7%	-

The above comparison indicates an increase in the covered membership during the three year inter-valuation period. The proportion of females continues to increase. The average ages continue to increase for all Groups, notwithstanding the increase in the covered membership; the average service has decreased for Group 1.

A comparison of the new entrant subset used at December 31, 2012 with that used at December 31, 2009 in determining the entry-age normal costs, is as follows:

	Group 1	Group 4	Groups 2/5
At December 31, 2012			
- Number	5,207	12,735	619
- Proportion of total	28.1%	68.6%	3.3%
- Average age at entry	37.7	35.3	30.0
- Average salary	$58,201	$52,628	$63,611
At December 31, 2009[1]			
- Number	6,570	17,716	925
- Proportion of total	26.1%	70.3%	3.6%
- Average age at entry	37.2	35.2	30.4
- Average salary	$58,208	$51,988	$61,687
Change 2009 to 2012			
- Number	- 20.7%	- 28.1%	- 33.1%
- Proportion of total	+ 2.0%	- 1.7%	- 0.3%
- Average age	+ 0.5 years	+ 0.1 years	- 0.4 years
- Average salary	no change	+ 1.2%	+ 3.1%

There is a decrease in the number of new entrants in the 2012 subset compared to the 2009 subset for all Groups. The average salary has increased for Groups 4 and 2/5. The average age of new entrants for Groups 1 and 4 has slightly increased and for Group 2/5 has slightly decreased.

[1] Figures are revised from our 2009 valuation report. We changed the methodology to define the new entrants profile in 2009, but the 2009 report showed the new entrants statistics based on the old methodology.

Appendix D: Inactive Member Data as at December 31, 2012

1. Inactive Members Assumed Reactivated on Valuation Date

Age group[1]	Group 1 (males)			Group 4 (females)		
	Number	Average annual earnings[2]	Average service (years)	Number	Average annual earnings[2]	Average service (years)
29 and below	20	53,415	3.2	71	53,793	3.0
30-34	50	58,539	4.2	176	57,622	3.8
35-39	53	62,594	4.8	229	58,566	4.9
40-44	69	63,220	7.3	186	57,809	5.8
45-49	63	63,682	8.8	193	56,387	6.9
50-54	66	63,522	10.7	230	55,862	8.6
55-59	58	65,275	11.5	189	56,605	10.2
60 & over	56	64,819	14.3	80	55,591	9.5
Total	**435**	**62,747**	**8.7**	**1,354**	**56,870**	**6.7**

Group[1]	Number	Average annual earnings[2]	Average service (years)	Average service (years) with 2.33% benefit rate
Group 2	3[3]	93,638	14.3	-
Group 5 (males)	9	85,169	9.3	0.7
Group 5 (females)	7	81,183	8.9	0.9

	Number	Average annual earnings[2]	Average service (years)
Total - All Groups	**1,808**	**$58,580**	**7.2**

[1] Age nearest birthday at December 31, 2012.

[2] Assumed same earnings as for active members in same age-group category.

[3] One male and two females, details are not provided due to privacy.

2. Members on Long-Term Disability with Projected Deferred Pensions

Age group[1]	Males		Females	
	Number	Average annual deferred pensions[2]	Number	Average annual deferred pensions[2]
29 & below	5	20,300	37	27,274
30-34	11	25,104	107	25,435
35-39	39	20,407	193	22,710
40-44	78	22,319	388	21,335
45-49	121	20,516	640	19,879
50-54	248	19,038	1,065	17,497
55-59	304	18,732	1,611	15,286
60 & over	357	14,983	1,588	12,781
Total	**1,163**	**18,196**	**5,629**	**16,463**

3. Other Inactive Members Entitled to Vested Pensions and Not Assumed Reactivated

Age group[1]	Males			Females		
		Average annual vested pensions			Average annual vested pensions	
	Number	Initial[3]	Offset at age 65	Number	Initial[3]	Offset at age 65
25-29	96	2,995	944	291	2,315	746
30-34	310	3,525	1,057	820	3,078	929
35-39	494	4,294	1,251	1,500	3,692	1,093
40-44	858	5,981	1,670	2,027	4,790	1,394
45-49	1,082	7,955	2,143	2,415	6,385	1,801
50-54	1,124	9,819	2,588	2,749	7,383	2,107
55-59	687	10,481	2,638	1,781	7,740	2,090
60 & over	381	7,790	1,828	920	6,146	1,646
Total	**5,032**	**7,640**	**2,028**	**12,503**	**5,887**	**1,665**

4. Remaining Inactive Members

Number	Member contributions with interest
19,078[4]	$72,301,713

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[1] Age nearest birthday at December 31, 2012.

[2] Basic lifetime portions assumed payable from age 62; males include 13 Group 2/5 members and females include 4 Group 2/5 members with pensions commencing from age 57; additional temporary pensions are payable to age 65.

[3] These pensions are assumed to commence at the first age at which the member is entitled to an unreduced pension, i.e. at various ages between 55 and 65.

[4] Includes 9 active, 284 disabled and 827 vested members, with invalid data.

Appendix E: Pensioner Data at December 31, 2012

1. Former Contributors

Age group[1]	Number of pensioners[2]	Annual Pensions ($000's)[3]				
		Single life	Joint life & survivor	Joint life & survivor with guarantee	Single life with guarantee	Temporary life
Male pensioners						
Less than 50	7	28	100	-	-	-
50-54	160	158	3,495	1,068	1,607	1,561
55-59	1,911	1,399	24,278	10,392	14,912	18,758
60-64	4,439	7,008	49,332	23,482	26,495	41,199
65-69	4,978	14,509	54,194	18,832	21,098	4,446
70-74	3,606	19,359	37,834	5,483	7,951	4
75-79	2,490	19,399	22,167	244	1,194	-
80-84	1,931	16,635	13,383	-	149	-
85-89	1,084	11,654	5,876	-	-	-
90 & over	476	6,226	2,061	-	-	-
Total	**21,082**	**96,375**	**212,720**	**59,501**	**73,406**	**65,968**
Female pensioners						
Less than 50	30	146	153	-	58	12
50-54	52	179	178	34	436	130
55-59	3,247	1,220	10,858	4,734	21,191	19,938
60-64	9,727	13,254	31,676	13,029	64,869	64,850
65-69	12,246	41,393	31,816	10,212	59,767	7,212
70-74	8,248	52,057	19,080	2,577	16,552	2
75-79	4,963	37,704	7,928	69	1,964	-
80-84	3,031	23,134	2,921	-	69	-
85-89	1,498	11,665	645	-	-	-
90 & over	750	7,756	162	-	-	-
Total	**43,792**	**188,508**	**105,417**	**30,655**	**164,906**	**92,144**
Grand Total	**64,874**	**284,883**	**318,137**	**90,156**	**238,312**	**158,112**

Supplemental pensions included in the above amounts are as follows:

Supplemental Pensions included	**501**	**1,839**	**852**	**1,208**	**-**

[1] Age nearest birthday at December 31, 2012.
[2] These numbers include only those who were formerly contributors to the plan.
[3] Including supplements to January 1, 2012.

2. Beneficiaries

Age group[1]	Number of beneficiaries[2]	Annual Pensions ($000's)[3]	
		Single life	Single life with guarantee
Male beneficiaries			
Less than 50	24	184	-
50-54	41	295	15
55-59	71	505	34
60-64	160	1,398	68
65-69	242	2,148	108
70-74	244	2,185	74
75-79	196	1,580	15
80-84	190	1,396	-
85-89	111	751	-
90 & over	40	236	-
Total	**1,319**	**10,678**	**314**
Female beneficiaries			
Less than 50	44	478	27
50-54	98	1,455	177
55-59	210	3,150	289
60-64	292	4,268	497
65-69	432	6,565	248
70-74	495	7,191	96
75-79	669	8,747	9
80-84	869	11,077	-
85-89	731	9,868	-
90 & over	581	8,143	-
Total	**4,421**	**60,942**	**1,343**
Remaining guarantees	**376**	**-**	**4,723**
Grand Total	**6,116**	**71,620**	**6,380**

Supplemental pensions included in the above amounts are as follows:

Supplemental Pensions included	**171**	**1**

[1] Age nearest birthday at December 31, 2012.
[2] These numbers include spouses (or estates) currently receiving benefits where the former contributor is deceased.
[3] Including supplements to January 1, 2012.

Appendix F: Development of Required Contribution Rates

All of the cost figures shown herein are integrated and on a level, i.e. "non-doubling" basis and are combined member/employer rates.

Normal ("entry-age") actuarial cost portion	2012 (%)	2009 (%)
- Group 1 (males)	14.79	14.45
- Group 4 (females)	15.24	14.98
- Groups 1/4 combined	15.09	14.81
- Group 2 (males and females combined)	18.18	17.86
- Group 5 (males and females combined)	21.01	20.66
- Groups 1/4/2/5 average	**15.37**	**15.00**

The change in the normal actuarial cost from 2009 to 2012 can be traced as follows:

	Groups 1 and 4			Group 2 %	Group 5 %	Groups 1/4/2/5 average %
	Group 1 %	Group 4 %	Combined %			
Normal cost at 2009 valuation	**14.45**	**14.98**	**14.81**	**17.86**	**20.66**	**15.00**
Data changes	0.03	0.00	0.00	(0.03)	(0.04)	0.09
Assumption changes:						
• Pre-retirement deaths electing a CV	0.04	0.03	0.04	0.04	0.04	0.04
• Pre-retirement mortality	0.00	0.01	0.00	0.01	0.01	0.00
• Disability incident rates	-	-	-	-	-	-
• Withdrawal rates	(0.03)	0.06	0.03	0.00	0.00	0.02
• Retirement rates	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)
• Post-retirement mortality	0.23	0.08	0.12	0.22	0.26	0.13
• Post-retirement mortality for disabled pensioners	0.01	0.02	0.02	0.01	0.01	0.02
• Administration expenses	0.10	0.10	0.10	0.10	0.10	0.10
Total change	**0.34**	**0.26**	**0.28**	**0.32**	**0.35**	**0.37**
Normal cost at 2012 valuation	**14.79**	**15.24**	**15.09**	**18.18**	**21.01**	**15.37**

Calculation of Required Contribution Rate

	2012	2009
1. Normal (entry-age) actuarial cost - average	15.37%	15.00%
2. Unfunded actuarial liability on entry-age basis ($000's)	($3,489,626)	($2,403,635)
3. Present value of existing amortization requirements ($000's)		
(i) 1.06% to 2018	519,972	675,242
(ii) 1.75% to 2024	1,592,191	n/a
(ii) 0.23% to 2024 for Group 5 only	7,140	n/a
4. Balance of unfunded liability to be amortized over 15 years ($000's) (= 2 + 3)	(1,370,323)	(1,728,393)
5. 15 year amortization of balance of unfunded actuarial liability	1.25%	1.75%
6. Total *PBSA* amortization requirement		
(i) to 2018	1.06	1.06
(ii) to 2024	1.75	1.75
(iii) to 2027	1.25	
Total *PBSA* amortization	**4.06**	**2.81**
Additional Group 5 amortization to 2024	0.23	0.23
7. Total *PBSA* minimum required contribution rate - average	**19.44**	**17.81**

The percentages are applied to members' total earnings and are integrated (i.e. reduced by 1.5% on members' salary up to the YMPE for each of the members and the employers, for a 3.0% total reduction).

Appendix G: Comparative Results

Comparative Results on Fully Indexed Basis, and with Income Tax Limits

The results herein are analogous to those contained in Schedules 1, 3 and 5 in the body of the report. For ease of comparison, we have repeated the 2012 Basic Account results; selected 2009 comparisons are also shown. The results are included for:

- Basic (i.e. non-indexed) benefits only, without tax limits;
- Basic plus Indexed, without tax limits;
- Basic only, with tax limits; and
- Basic plus Indexed, with tax limits

Schedule G1[1] – Statement of Actuarial Position as at December 31, 2012

Present Plan - ($000's)

	Without Tax Limits		With Tax Limits	
	Basic Only	**Basic + Indexed**	**Basic Only**	**Basic + Indexed**
Assets				
Market value of Fund	26,145,681	30,729,575	26,145,681	30,729,575
Asset smoothing adjustment	(1,327,270)	(1,559,969)	(1,327,270)	(1,559,969)
Smoothed value of Fund	**24,818,411**	**29,169,606**	**24,818,411**	**29,169,606**
Actuarial present values of:				
future contributions at entry-age rates	11,110,009	15,390,176	11,054,753	15,311,392
present value of existing amortization				
(i) 1.06% to 2018	519,972	519,972	519,972	519,972
(ii) 1.75% to 2024	1,592,191	1,592,191	1,592,191	1,592,191
(iii) Group 5 only to 2024[2]	7,140	9,624	7,450	9,624
Total Assets	**38,047,723**	**46,681,569**	**37,992,777**	**46,602,785**
Liabilities				
Actuarial present values for:				
▪ pensions being paid	11,411,717	15,324,341	11,357,571	15,249,739
▪ inactive members	1,777,817	2,687,509	1,777,253	2,686,734
▪ active members	25,635,315	35,472,852	25,452,422	35,220,437
▪ future expenses	593,197	593,197	593,197	593,197
Total Liabilities	**39,418,046**	**54,077,899**	**39,180,443**	**53,750,107**
Surplus (Unfunded Actuarial Liability)	**(1,370,323)**	**(7,396,330)**	**(1,187,666)**	**(7,147,322)**
Present value of existing amortization (items (i) and (ii))	No adjustment needed	(2,112,163)	No adjustment needed	(2,112,163)
Surplus (Unfunded Liability) to be amortized over 15 years	**(1,370,323)**	**(9,508,493)**	**(1,187,666)**	**(9,259,485)**
Selected 2009 Comparisons				
Total Assets including amortization	33,526,101	41,295,956	33,475,975	41,224,268
Total Liabilities	33,526,101	45,447,544	33,362,952	45,223,839
Surplus (Unfunded Actuarial Liability)	0[3]	(4,151,588)[4]	113,023[5]	(3,999,571)[6]

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[1] This Schedule combines schedules G1 and G2 from the 2009 report.

[2] 0.23% for Basic without tax limit, 0.24% for Basic with tax limit and 0.31% for Basic + Indexed with and without tax limit.

[3] Prior to the 2009 amortization of 1.75% of salary, the unfunded liability was $1,728,393 thousand.

[4] Prior to the 2009 amortization of 1.75% of salary, the unfunded liability was $5,879,981 thousand.

[5] Prior to the 2009 amortization of 1.75% of salary, the unfunded liability was $1,615,370 thousand.

[6] Prior to the 2009 amortization of 1.75% of salary, the unfunded liability was $5,727,964 thousand.

Schedule G3 (1) – Current and Required Contributions Rates - December 31, 2012 - Basic only

		Without Tax Limits			With Tax Limits		
	Current contribution rates[1, 2]	**Member**	**Employer**	**Total**	**Member**	**Employer**	**Total**
1	Group 1	8.30	9.10	17.40	8.30	9.10	17.40
2	Group 4	8.30	9.61	17.91	8.30	9.61	17.91
3	Group 2	8.30	12.75	21.05	8.30	12.75	21.05
4	Group 5	9.82	13.74	23.56	9.82	13.74	23.56
5	**Average**	**8.35**	**9.70**	**18.05**	**8.35**	**9.70**	**18.05**
	Entry-age normal cost rates[1]						
6	Group 1			14.79			14.69
7	Group 4			15.24			15.18
8	Group 2			18.18			18.18
9	Group 5			21.01			21.00
10	**Entry-age normal cost - Average**			**15.37**			**15.30**
	Amortization of unfunded actuarial liability (surplus)						
11	15 year amortization			3.18			3.01
	PBSA amortization						
12	• to 2018			1.06			1.06
13	• to 2024			1.75			1.75
14	• to 2027			1.25			1.08
15	**Total PBSA amortization** (=12+13+14)			**4.06**			**3.89**
16	Additional Group 5 amortization (to 2024)[3]			0.23			0.24
	Total contribution rate[1]						
17	15 year amortization – Average			18.56			18.32
	PBSA minimum rate basis[4]						
18	Group 1 (= 6+15)			18.85			18.58
19	Group 4 (= 7+15)			19.30			19.07
20	Group 2 (= 8+15)			22.24			22.07
21	Group 5 (= 9+15+16)			25.30			25.13
22	**PBSA minimum rate - Average**			**19.44**			**19.21**
23	**Required Contribution Rate Increase – Average**			**1.39**			**n/a**

[1] Less 1.5% of salary up to the YMPE (for each of the members and the employers).

[2] The current rates are shown on an equivalent "non-doubling" basis, based on current payrolls.

[3] This amount was established at the 2009 valuation to allow for the fact that members transferring from Group 2 are older than the assumed entry age to Group 5 and therefore the value of their future contributions at the entry age rate is less than the value of the corresponding future liability. This amount amortizes the shortfall over 15 years.

[4] The total contribution rate to the plan needs to comply with the PBSA requirements. The PBSA does not apply at the group level.

Schedule G3 (2) – Selected 2009 Comparisons - December 31, 2009 - Basic only

		Without Tax Limits			With Tax Limits		
	Current contribution rates[1, 2]	**Member**	**Employer**	**Total**	**Member**	**Employer**	**Total**
1	Group 1	7.49	8.04	15.53	7.49	8.04	15.53
2	Group 4	7.49	8.57	16.06	7.49	8.57	16.06
3	Group 2	7.49	13.09	20.58	7.49	13.09	20.58
4	Group 5	8.96	14.56	23.52	8.96	14.56	23.52
5	**Average**	**7.49**	**8.71**	**16.20**	**7.49**	**8.71**	**16.20**
	Entry-age normal cost rates[1]						
6	Group 1			14.45			14.33
7	Group 4			14.98			14.93
8	Group 2			17.86			17.84
9	Group 5			20.66			20.62
10	**Entry-age normal cost - Average**			**15.00**			**14.93**
	Amortization of unfunded actuarial liability (surplus)						
11	15 year amortization			2.44			2.32
	PBSA amortization						
12	• to 2018			1.06			0.91
13	• to 2024			1.75			1.74
14	• to 2027						
15	**Total PBSA amortization** (=12+13+14)			**2.81**			**2.65**
16	Additional Group 5 amortization (to 2024)[3]			0.23			0.24
	Total contribution rate[1]						
17	15 year amortization – Average (=10+11)			17.44			17.25
	PBSA minimum rate basis[4]						
18	Group 1 (= 6+15)			17.26			16.98
19	Group 4 (= 7+15)			17.79			17.58
20	Group 2 (= 8+15)			20.67			20.49
21	Group 5 (= 9+15+16)			23.70			23.51
22	**PBSA minimum rate - Average**			**17.81**			**17.58**
23	**Required Contribution Rate Increase – Average**			**1.61**			**n/a**

[1] Less 1.5% of salary up to the YMPE (for each of the members and the employers).

[2] The current rates are shown on an equivalent "non-doubling" basis, based on current payrolls.

[3] This amount was established at the 2009 valuation to allow for the fact that members transferring from Group 2 are older than the assumed entry age to Group 5 and therefore the value of their future contributions at the entry age rate is less than the value of the corresponding future liability. This amount amortizes the shortfall over 15 years.

[4] The total contribution rate to the plan needs to comply with the PBSA requirements. The PBSA does not apply at the group level.

Schedule G3 (3) – Current and Required Contributions Rates - December 31, 2012 – Basic + Indexed

		Without Tax Limits			With Tax Limits		
	Current contribution rates[1, 2]	**Member**	**Employer**	**Total**	**Member**	**Employer**	**Total**
1	Group 1	9.30	9.30	18.60	9.30	9.30	18.60
2	Group 4	9.30	9.81	19.11	9.30	9.81	19.11
3	Group 2	9.30	12.95	22.25	9.30	12.95	22.25
4	Group 5	11.24	14.36	25.60	11.24	14.36	25.60
5	**Average**	**9.37**	**9.91**	**19.28**	**9.37**	**9.91**	**19.28**
	Entry-age normal cost rates[1]						
6	Group 1			19.28			19.14
7	Group 4			20.40			20.32
8	Group 2			24.13			24.13
9	Group 5			28.17			28.16
10	**Entry-age normal cost - Average**			**20.41**			**20.32**
	Amortization of unfunded actuarial liability (surplus)						
11	15 year amortization			8.68			8.45
12	PBSA amortization			n/a			n/a
13	Additional Group 5 amortization (to 2024)[3]			0.31			0.31
	Total contribution rate[1]						
14	15 year amortization – Average			29.10			28.78

[1] Less 1.5% of salary up to the YMPE (for each of the members and the employers).

[2] The current rates are shown on an equivalent "non-doubling" basis, based on current payrolls.

[3] This amount was established at the 2009 valuation to allow for the fact that members transferring from Group 2 are older than the assumed entry age to Group 5 and therefore the value of their future contributions at the entry age rate is less than the value of the corresponding future liability. This amount amortizes the shortfall over 15 years.

Schedule G3 (4) – Selected 2009 Comparisons - December 31, 2009 – Basic + Indexed

		Without Tax Limits			With Tax Limits		
	Current contribution rates[1, 2]	**Member**	**Employer**	**Total**	**Member**	**Employer**	**Total**
1	Group 1	8.49	8.24	16.73	8.49	8.24	16.73
2	Group 4	8.49	8.77	17.26	8.49	8.77	17.26
3	Group 2	8.49	13.29	21.78	8.49	13.29	21.78
4	Group 5	10.38	15.18	25.56	10.38	15.18	25.56
5	**Average**	**8.49**	**8.91**	**17.40**	**8.49**	**8.91**	**17.40**
	Entry-age normal cost rates[1]						
6	Group 1			18.80			18.64
7	Group 4			20.11			20.04
8	Group 2			23.65			23.62
9	Group 5			27.61			27.56
10	**Entry-age normal cost - Average**			**19.94**			**19.85**
	Amortization of unfunded actuarial liability (surplus)						
11	15 year amortization			6.65			6.50
12	PBSA amortization			n/a			n/a
13	Additional Group 5 amortization (to 2024)[3]			0.31			0.31
	Total contribution rate[1]						
14	15 year amortization – Average			26.59			26.35

[1] Less 1.5% of salary up to the YMPE (for each of the members and the employers).

[2] The current rates are shown on an equivalent "non-doubling" basis, based on current payrolls.

[3] This amount was established at the 2009 valuation to allow for the fact that members transferring from Group 2 are older than the assumed entry age to Group 5 and therefore the value of their future contributions at the entry age rate is less than the value of the corresponding future liability. This amount amortizes the shortfall over 15 years.

Schedule G5 – Accrued Liabilities and Funded Ratio – December 31, 2012

Present Plan - ($000's)

($000's)	Without Tax Limits		With Tax Limits	
	Basic Only	Basic + Indexed	Basic Only	Basic + Indexed
Assets – smoothed value	**24,818,411**	**29,169,606**	**24,818,411**	**29,169,606**
Accrued Liabilities				
▪ pensions being paid	11,411,717	15,324,341	11,357,571	15,249,739
▪ inactive members	1,777,817	2,687,509	1,777,253	2,686,734
▪ active members	13,530,735	18,691,744	13,415,099	18,532,614
Total Accrued Liabilities	**26,720,269**	**36,703,594**	**26,549,923**	**36,469,087**
Surplus (Unfunded Actuarial Liability)	**(1,901,858)**	**(7,533,988)**	**(1,731,512)**	**(7,299,481)**
Funded Ratio – Fund ÷ Total Accrued Liabilities	**92.9%**	**79.5%**	**93.5%**	**80.0%**
Selected 2009 Comparisons				
Assets	21,414,660	25,430,893	21,414,660	25,430,893
Total Liabilities	22,384,886	30,238,446	22,281,066	30,096,377
Surplus (Unfunded Actuarial Liability)	(970,226)	(4,807,553)	(866,406)	(4,665,484)
Funded Ratio	95.7%	84.1%	96.1%	84.5%

Appendix H: Actuarial Position on Current Contribution Basis as at December 31, 2012

Report disclosure changes

In previous valuation reports, we showed results for the basic benefits in two different ways:

- **Current Contribution Basis**: Firstly, the funded position assuming contributions would continue at the current rate was calculated (this calculation included as an asset the value of future contributions assuming that the current rate would continue indefinitely). This result, which was disclosed in Schedule 1 of our previous reports, provided insight into the financial position of the Basic Account if contributions were to remain unchanged in the future.
- **Entry Age Basis**: Secondly, the funded position was calculated assuming that contributions would be equal in value to the value of contributions at the entry-age rate, plus scheduled future amortization amounts. This result, which was disclosed in Schedule 2 of our previous reports, established the financial position of the plan for the purposes of calculating the required contribution rate.

Prior to Joint Trusteeship in 2001, the Plan was not required to meet the PBSA funding requirements and the basis for establishing contribution rates was, by practice, the Current Contribution approach as depicted in the former Schedule 1. This approach assumed the current rates would continue indefinitely into the future.

While the move to Joint Trusteeship continued to exempt the Plan from the PBSA funding requirements, the signatories to the Joint Trust Agreement included a requirement to fund the plan according to the "going-concern" requirements of the PBSA (Article 10) for each valuation. Effective with the 2000 valuation, the Entry Age approach, depicted in the former Schedule 2 and in Schedule 1 to the current report, has appropriately been the basis on which contribution rate adjustments have been determined.

The Joint Trust Agreement also contains "transitional financial arrangements" (Joint Trust Agreement Appendix B and described in Appendix A of this report on page 43) which set out benefit improvements and contribution rate adjustments which must be achieved prior to any reduction in contribution rates, including reductions arising from the expiry of previously established amortization requirements (unfunded liabilities have to be amortized over 15 years from the date they are established). These requirements could result in a situation where the actual contribution rates following a valuation are higher than the required PBSA contribution rates. While this could suggest a funded position more closely aligned with the Current Contribution approach, there is no legislative or regulatory requirement to continue paying the current contribution rates indefinitely and the parties to the Agreement could change the transitional requirements without regulatory approval. As a result, the Current Contribution Basis is less useful, especially since the various amortization amounts are payable for 15 years or less, rather than indefinitely.

In an effort clarify the basis on which contribution rates are set, Schedule 1 to this report shows only the Entry Age result used to determine required contribution rates. The Current Contribution result is reported for information purposes below. The methods and process for setting the contribution rate has not changed.

The following shows the results of the December 31, 2012 valuation assuming that member and employer contribution rates for the basic pensions continue to be made at the current rates set out in the Plan rules. It replicates Schedule 1 under Part 1 of Section IV of the 2009 report.

Basic Account – Non-Indexed Benefits ($000's)

	2012	2009
Assets		
Market Value of Basic Account	26,145,681	20,363,772
Asset Smoothing Adjustment	(1,327,270)	1,050,888
Smoothed Value of Basic Account	**24,818,411**	**21,414,660**
Actuarial present values of:		
▪ Future members contributions of current rates	6,102,757	4,830,756
▪ Future employer contributions of current rates	7,686,049	6,256,496
Total Assets	**38,607,217**	**32,501,912**
Liabilities		
Actuarial present values for:		
▪ Pensions being paid	11,411,717	8,900,555
▪ Inactive members	1,777,817	1,590,832
▪ Active members	25,635,315	22,579,260
▪ Future expenses	593,197	455,454
Total Liabilities	**39,418,046**	**33,526,101**
Surplus (Unfunded Actuarial Liability)	**(810,829)**	**(1,024,189)**