GRS Gabriel Roeder Smith & Company
Consultants & Actuaries

# POLICEMEN'S ANNUITY AND BENEFIT FUND OF CHICAGO

## GASB STATEMENTS NOS. 67 AND 68 ACCOUNTING AND FINANCIAL REPORTING FOR PENSIONS

DECEMBER 31, 2015

GRS
Gabriel Roeder Smith & Company
Consultants & Actuaries
20 North Clark Street
Suite 2400
Chicago, IL 60602-5111
312.456.9800 phone
312.456.9801 fax
www.gabrielroeder.com

June 13, 2016

The Retirement Board of the
Policemen's Annuity and Benefit Fund
221 North LaSalle Street, Suite 1626
Chicago, IL 60601-1404

Dear Members of the Board:

This report provides accounting and financial reporting information as of December 31, 2015, that is intended to comply with the Governmental Accounting Standards Board ("GASB") Statements Nos. 67 and 68 for the Policemen's Annuity and Benefit Fund Of Chicago ("PABF"). These calculations have been made on a basis that is consistent with our understanding of these Statements.

GASB Statement No. 67 is the accounting standard that applies to the stand-alone financial reports issued by retirement systems. GASB Statement No. 68 establishes accounting and financial reporting for state and local government employers who provide their employees (including former employees) pension benefits through a trust.

Our calculation of the liability associated with the PABF benefits (described in Section E) was performed for the purpose of providing reporting and disclosure information that satisfies the requirements of GASB Statements Nos. 67 and 68. The calculation of the plan's liability for this report is not applicable for funding purposes of the plan. A calculation of the plan's liability for purposes other than satisfying the requirements of GASB Statements Nos. 67 and 68 may produce significantly different results. This report may be provided to parties other than PABF only in its entirety and only with the permission of PABF.

This report is based upon information, furnished to us by PABF, concerning retirement and ancillary benefits, active members, deferred vested members, retirees and beneficiaries, and financial data. This information was checked for internal consistency, but it was not audited.

This report complements the funding actuarial valuation report that was provided to PABF and should be considered in conjunction with that report. Please see the funding actuarial valuation report as of December 31, 2015, for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions.

Our valuation and projections assume the sponsor will make the contributions required by state statute. To the extent the sponsor does not make the statutory required contribution, the results contained in this report could be significantly different.

Public Act 96-1495 (PA 96-1495), effective as of January 1, 2011, requires that the City finance plan benefits on an actuarial basis commencing with tax levy year 2015. The funding policy requires that future employer contributions, employee contributions and other fund income is sufficient to produce 90% funding by fiscal year end 2040. The projections are based on an open group, level percent of pay financing and the Projected Unit Credit cost method.

Please note that the PA 96-1495 funding policy was changed by Public Act 99-0506 (PA 99-0506), effective as of May 30, 2016. The funding policy defined in PA 99-0506 significantly defers contributions when compared to the provisions of PA 96-1495. The new funding policy requires fixed City contributions for payment years 2016 to 2020, and level percent of pay contributions for years 2021 to 2055 that, along with member contributions and investment income, are projected to produce a funded ratio of 90% by 2055.

The funding valuation results referenced in this report were prepared based on the statutes in effect as of December 31, 2015, and will be used solely to comply with the financial reporting requirements under GASB Statements Nos. 56, 67 and 68. The contributions contained in this report are used to develop the blended discount rate under GASB Statements No. 67 and 68. The statutory funding contributions contained in this report are no longer valid as of May 30, 2016.

We strongly recommend that a formal liquidity and asset allocation study be performed as soon as practical and that GRS prepare statutory funding and accounting impact statements of PA 99-0506 using updated economic assumptions approved by the Board.

The valuation results set forth in this report are based on the data and actuarial techniques described above, and upon the provisions of the Fund as of the valuation date. To the best of our knowledge, the information contained in this report is complete and accurate based on the statutes in effect as of December 31, 2015, and fairly presents the actuarial position of the Fund as of December 31, 2015, for purposes of complying with the financial reporting requirements under GASB Statements Nos. 56, 67 and 68. All calculations have been made in conformity with generally accepted actuarial principles and practices as well as with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

The assumptions used in this valuation are reasonable and appropriate for purposes of measuring the GASB Statements Nos. 67 and 68 pension liability as of December 31, 2015, under the provisions of PA 96-1495.

This report should not be relied on for any purpose other than the purpose stated.

The signing actuaries are independent of the plan sponsor.

**Alex Rivera** and **Lance Weiss** are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,

By Alex Rivera

Alex Rivera
F.S.A., E.A., M.A.A.A., F.C.A.

By Lance J. Weiss

Lance Weiss
E.A., M.A.A.A., F.C.A.

AR/LW:rg

## Additional Disclosure – Public Act 99-0506

Public Act 99-0506 became law on May 30, 2016, and changes the City of Chicago's required contribution to the Policemen's Annuity and Benefit Fund of Chicago ("PABF").

The law in effect prior to May 30, 2016, Public Act 96-1495, required that the City of Chicago (the "City") make level percent of pay contributions for plan years 2015 through 2040 that along with member contributions and investment earnings would generate a projected funded ratio of 90% by plan year end 2040.

Under PA 99-0506, City contributions are equal to $420 million in payment year 2016, $464 million in payment year 2017, $500 million in payment year 2018, $557 million in payment year 2019 and $579 million in payment year 2020. For payment years after 2020, the City is required to make level percent of pay contributions for plan years 2020 through 2055 that along with member contributions and investment earnings are expected to generate a projected funded ratio of 90% by plan year end 2055.

We understand the Plan auditor and City auditor have requested that GRS reflect paragraphs 8 and 10 of GASB Statement No. 56 for purposes of financial reporting of the PABF at plan year end December 31, 2015. That is, the auditors have requested that the December 31, 2015, actuarial valuations for GASB Statements Nos. 67 and 68 purposes be performed based on the provisions of Public Act 96-1495, but with disclosure of the estimated impact of PA 99-0506.

As a result, the funding actuarial valuation results referenced in this report were prepared based on the statutes in effect as of December 31, 2015, and will be used solely to comply with the financial reporting requirements under GASB Statements No. 56, 67 and 68. The contributions contained in this report will be used to develop the blended discount rate under GASB Statements No. 67 and 68. The statutory funding amounts contained in this report are no longer valid as of May 30, 2016.

The reduction in City contributions in payment years 2016 through 2020 is expected to produce more liquidity strain to the system. That is, benefits and expenses are projected to be significantly greater than City and member contributions during this period as shown in the following table ($ in millions).

| **Payment Year** | **City Contributions** | **Member Contributions** | **Benefits and Expenses** | **Net Cash Flow** |
|---|---|---|---|---|
| 2016 | $420 | $100 | $696 | $(176) |
| 2017 | $464 | $110 | $717 | $(143) |
| 2018 | $500 | $113 | $748 | $(135) |
| 2019 | $557 | $116 | $782 | $(109) |
| 2020 | $579 | $119 | $816 | $(118) |
| | | | | |
| **Total** | $2,520 | $558 | $3,759 | $(681) |

If City and member contributions are less than benefits and expenses, then the shortfall would need to be paid from either investment earnings or principal. Furthermore, delaying the funding target year from 2040 to 2055 is projected to reduce the City's annual contributions in the initial years of the projection resulting in more liquidity strain to the system, and less assets available for investment.

The contribution policy under PA 99-0506 is expected to significantly defer the City's contribution requirement when compared to the funding policy under PA 96-1495. A deferment in City contributions is expected to reduce investment income and growth in assets, and ultimately increase the City's contribution requirements in the future.

Given the Fund's low funded ratio of 25%, the deferment of City contributions, and increase in liquidity strain, a long-term investment return assumption of 7.50%, used to project assets and discount benefits, may be difficult support under the Actuarial Standards of Practice.

We strongly recommend that a formal liquidity and asset allocation study be performed as soon as practical and that GRS prepare statutory funding and accounting impact statements of PA 99-0506 using updated economic assumptions approved by the Board.

As an illustration of the potential cost impact, decreasing the investment return, wage inflation and general inflation by 50 basis points, is expected to reduce the GASB Statements Nos. 67 and 68 blended discount rate by approximately 40 basis points and increase the Total Pension Liability, by approximately $450 million to $470 million.

***Auditor's Note – This information is intended to assist in preparation of the financial statements of the Policemen's Annuity and Benefit Fund Of Chicago. Financial statements are the responsibility of management, subject to the auditor's review. Please let us know if the auditor recommends any changes.***

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# SECTION A

## EXECUTIVE SUMMARY

# EXECUTIVE SUMMARY AS OF DECEMBER 31, 2015

| | 2015 |
|---|---|
| Actuarial Valuation Date | December 31, 2015 |
| Measurement Date of the Net Pension Liability | December 31, 2015 |
| Employer's Fiscal Year Ending Date (Reporting Date) | December 31, 2015 |
| **Membership** | |
| Number of | |
| - Retirees and Beneficiaries | 13,210 |
| - Inactive, Nonretired Members | 637 |
| - Active Members | 12,061 |
| - Total | 25,908 |
| Covered Payroll | $ 1,086,607,979 |
| **Net Pension Liability** | |
| Total Pension Liability | $ 12,032,733,000 |
| Plan Fiduciary Net Position | 3,058,949,037 |
| Net Pension Liability | $ 8,973,783,963 |
| Plan Fiduciary Net Position as a Percentage of Total Pension Liability | 25.42% |
| Net Pension Liability as a Percentage of Covered Payroll | 825.85% |
| **Development of the Single Discount Rate** | |
| Single Discount Rate Beginning of Year | 7.15% |
| Single Discount Rate End of Year | 7.15% |
| Long-Term Expected Rate of Investment Return | 7.50% |
| Long-Term Municipal Bond Rate Beginning of Year* | 3.56% |
| Long-Term Municipal Bond Rate End of Year* | 3.57% |
| Last year ending December 31 in the 2015 to 2114 projection period for which projected benefit payments are fully funded | 2063 |
| **Total Pension Expense** | $ 734,928,723 |

**Deferred Outflows and Deferred Inflows of Resources by Source to be recognized in Future Pension Expenses**

| | Deferred Outflows of Resources | Deferred Inflows of Resources |
|---|---|---|
| Difference between expected and actual experience | $ - | $ 87,779,617 |
| Changes in assumptions | - | - |
| Net difference between projected and actual earnings on pension plan investments | 188,054,720 | - |
| Total | $ 188,054,720 | $ 87,779,617 |

*Source: *"State & local bonds" rate from Federal Reserve statistical release (H.15) as of December 31, 2015. The statistical release describes this rate as "Bond Buyer Index, general obligation, 20 years to maturity, mixed quality." In describing this index, the Bond Buyer notes that the bonds' average credit quality is roughly equivalent to Moody's Investors Service's Aa2 rating and Standard & Poor's Corp.'s AA.*

# DISCUSSION

## Accounting Standard

For pension plans that are administered through trusts or equivalent arrangements, Governmental Accounting Standards Board (“GASB”) Statement No. 67 establishes standards of financial reporting for separately issued financial reports and specifies the required approach for measuring the pension liability. Similarly, GASB Statement No. 68 establishes standards for state and local government employers (as well as non-employer contributing entities) to account for and disclose the net pension liability, pension expense and other information associated with providing retirement benefits to their employees (and former employees) on their basic financial statements.

The following discussion provides a summary of the information that is required to be disclosed under these accounting standards. A number of these disclosure items are provided in this report. However, certain non-actuarial information, such as notes regarding accounting policies and investments, is not included in this report and the retirement system and/or plan sponsor will be responsible for preparing and disclosing that information to comply with these accounting standards.

## Financial Statements

GASB Statement No. 68 requires state or local governments to recognize the net pension liability and the pension expense on their financial statements. The net pension liability is the difference between the total pension liability and the plan’s fiduciary net position. In traditional actuarial terms, this is analogous to the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer’s contribution requirement).

Paragraph 57 of GASB Statement No. 68 states, “Contributions to the pension plan from the employer subsequent to the measurement date of the collective net pension liability and before the end of the employer’s reporting period should be reported as a deferred outflow of resources related to pensions.”

The pension expense recognized each fiscal year is equal to the change in the net pension liability from the beginning of the year to the end of the year, adjusted for deferred recognition of the liability and investment experience.

Pension plans that prepare their own, stand-alone financial statements are required to present two financial statements – a statement of fiduciary net position and a statement of changes in fiduciary net position in accordance with GASB Statement No. 67. The *statement of fiduciary net position* presents the assets and liabilities of the pension plan at the end of the pension plan’s reporting period. The *statement of changes in fiduciary net position* presents the additions, such as contributions and investment income, and deductions, such as benefit payments and expenses, and net increase or decrease in the fiduciary net position.

**Notes to Financial Statements**

GASB Statement No. 68 requires the notes of the employer's financial statements to disclose the total pension expense, the pension plan's liabilities and assets and deferred outflows and inflows of resources related to pensions.

GASB Statement Nos. 67 and 68 require the notes of the financial statements for the employers and pension plans to include certain additional information. The list of disclosure items should include:

- A description of benefits provided by the plan;
- The type of employees and number of members covered by the pension plan;
- A description of the plan's funding policy, which includes member and employer contribution requirements;
- The pension plan's investment policies;
- The pension plan's fiduciary net position, net pension liability and the pension plan's fiduciary net position as a percentage of the total pension liability;
- The net pension liability using a discount rate that is 1% higher and 1% lower than used to calculate the total pension liability and net pension liability for financial reporting purposes;
- Significant assumptions and methods used to calculate the total pension liability;
- Inputs to the discount rates; and
- Certain information about mortality assumptions and the dates of experience studies.

Retirement systems that issue stand-alone financial statements are required to disclose additional information in accordance with GASB Statement No. 67. This information includes:

- The composition of the pension plan's board and the authority under which benefit terms may be amended;
- A description of how fair value is determined;
- Information regarding certain reserves and investments, which include concentrations of investments greater than or equal to 5%, receivables and insurance contracts excluded from plan assets; and
- Annual money-weighted rate of return.

**Required Supplementary Information**

GASB Statement No. 67 requires a 10-year fiscal history of:

- Sources of changes in the net pension liability;
- Information about the components of the net pension liability and related ratios, including the pension plan's fiduciary net position as a percentage of the total pension liability and the net pension liability as a percent of covered-employee payroll; and
- A comparison of the actual employer contributions to the actuarially determined contributions based on the plan's funding policy.

## Timing of the Valuation

An actuarial valuation to determine the total pension liability is required to be performed at least every two years. The net pension liability and pension expense should be measured as of the pension plan's fiscal year end (measurement date) on a date that is within the employer's prior fiscal year. If the actuarial valuation used to determine the total pension liability is not calculated as of the measurement date, the total pension liability is required to be rolled forward from the actuarial valuation date to the measurement date.

The total pension liability shown in this report is based on an actuarial valuation performed as of December 31, 2015, and a measurement date of December 31, 2015.

## Single Discount Rate

Projected benefit payments are required to be discounted to their actuarial present values using a Single Discount Rate that reflects (1) a long-term expected rate of return on pension plan investments (to the extent that the plan's fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating (which is published by the Federal Reserve) as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is 7.50%; the municipal bond rate is 3.57% (based on the weekly rate closest to but not later than the measurement date of the "state & local bonds" rate from Federal Reserve statistical release (H.15)); and the resulting Single Discount Rate is 7.15%.

## Effective Date and Transition

GASB Statement Nos. 67 and 68 are effective for fiscal years beginning after June 15, 2013, and June 15, 2014, respectively; earlier application is encouraged by the GASB.

## Subsequent Event

Public Act 99-0506 (PA 99-0506) became law on May 30, 2016, and changed the City of Chicago's required contribution and the funding policy for PABF. The results presented in the report are based on the law in effect as of December 31, 2015, and do not include any of the funding changes under PA 99-0506.

## SECTION B

FINANCIAL STATEMENTS

Auditor's Note: This information is intended to assist in preparation of the financial statements of the Policemen's Annuity and Benefit Fund Of Chicago. Financial statements are the responsibility of management, subject to the auditor's review. Please let us know if the auditor recommends any changes.

# PENSION EXPENSE UNDER GASB STATEMENT NO. 68
# FISCAL YEAR ENDED DECEMBER 31, 2015

| | | |
|---|---|---|
| **A. Expense** | | |
| 1. Service Cost Including Pension Plan Administrative Expense | $ | 213,584,647 |
| 2. Interest on the Total Pension Liability | | 832,972,131 |
| 3. Current-Period Benefit Changes | | - |
| 4. Employee Contributions (made negative for addition here) | | (107,626,311) |
| 5. Projected Earnings on Plan Investments (made negative for addition here) | | (229,734,605) |
| 6. Other Changes in Plan Fiduciary Net Position | | (3,091,545) |
| 7. Recognition of Outflow (Inflow) of Resources due to Liabilities | | (18,189,274) |
| 8. Recognition of Outflow (Inflow) of Resources due to Assets | | 47,013,680 |
| **9. Total Pension Expense** | **$** | **734,928,723** |
| | | |
| **B. Reconciliation of Net Pension Liability** | | |
| **1. Net Pension Liability Beginning of Year** | **$** | **8,711,416,237** |
| 2. Pension Expense | | 734,928,723 |
| 3. Employer Contributions (made negative for addition here) | | (572,836,100) |
| 4. Deferred Investment Experience (inflows)/outflows | | 188,054,720 |
| 5. Deferred Liability Experience (inflows)/outflows | | (87,779,617) |
| 6. Deferred Assumption Changes (inflows)/outflows | | - |
| **7. Net Pension Liability End of Year** | **$** | **8,973,783,963** |

# STATEMENT OF OUTFLOWS AND INFLOWS ARISING FROM CURRENT AND PRIOR REPORTING PERIODS
## FISCAL YEAR ENDED DECEMBER 31, 2015

**A. Change in Outflows and (Inflows) of Resources during Current Plan Year**

| **Experience (Gain)/Loss** | Balance at Beginning of Year | Amortization Factor | Amortization | Balance at End of Year |
|---|---|---|---|---|
| 1. Differences between expected and actual non-investment experience | $ (105,968,891) | 5.8259 | $ (18,189,274) | $ (87,779,617) |
| 2. Assumption Changes | - | 5.8259 | - | - |
| 3. Difference between expected and actual investment earnings | 235,068,400 | 5.0000 | 47,013,680 | 188,054,720 |
| **4. Total** | $ 129,099,509 | | $ 28,824,406 | $ 100,275,103 |

**B. Outflows and Inflows of Resources by Source to be recognized in Current Pension Expense**

| | Outflows of Resources | Inflows of Resources | Net Outflows (Inflows) of Resources |
|---|---|---|---|
| 1. Differences between expected and actual non-investment experience | $ - | $ 18,189,274 | $ (18,189,274) |
| 2. Assumption Changes | - | - | - |
| 3. Difference between expected and actual investment earnings | 47,013,680 | - | 47,013,680 |
| **4. Total** | $ 47,013,680 | $ 18,189,274 | $ 28,824,406 |

**C. Deferred Outflows and Deferred Inflows of Resources by Source to be recognized in Future Pension Expenses**

| | Deferred Outflows of Resources | Deferred Inflows of Resources | Net Deferred Outflows (Inflows) of Resources |
|---|---|---|---|
| 1. Differences between expected and actual non-investment experience | $ - | 87,779,617 | $ (87,779,617) |
| 2. Assumption Changes | - | - | - |
| 3. Difference between expected and actual investment earnings | 188,054,720 | - | 188,054,720 |
| **4. Total** | $ 188,054,720 | $ 87,779,617 | $ 100,275,103 |

**D. Deferred Outflows and Deferred Inflows of Resources by Year to be recognized in Future Pension Expenses**

| Year Ending December 31 | Net Deferred Outflows of Resources | Net Deferred Inflows of Resources |
|---|---|---|
| 2016 | $ 47,013,680 | $ 18,189,274 |
| 2017 | 47,013,680 | 18,189,274 |
| 2018 | 47,013,680 | 18,189,274 |
| 2019 | 47,013,680 | 18,189,274 |
| 2020 | - | 15,022,521 |
| Thereafter | - | - |
| **Total** | $ 188,054,720 | $ 87,779,617 |

# STATEMENT OF FIDUCIARY NET POSITION
# YEARS ENDED DECEMBER 31, 2015, AND 2014

| | 2015 | 2014 |
|---|---|---|
| **Assets** | | |
| Receivables | | |
| Employer | $ 579,815,440 | $ 184,457,332 |
| Plan member | 4,815,841 | 4,739,959 |
| Due from Broker - net | 89,831,833 | 117,341,100 |
| Interest and dividends | 6,986,789 | 6,099,084 |
| Other receivables | - | - |
| Total receivables | 681,449,903 | 312,637,475 |
| Investments - at fair value | | |
| Cash and short-term investements | 73,066,550 | 135,835,676 |
| Equities | 1,391,379,873 | 1,493,568,427 |
| Fixed income | 760,884,485 | 911,238,422 |
| Private equity | 156,327,767 | 182,463,748 |
| Real estate | 80,387,687 | 94,281,030 |
| Hedge funds | 9,954,440 | 100,368,762 |
| Infrastructure | 38,932,764 | 36,538,895 |
| Subtotal | 2,510,933,566 | 2,954,294,960 |
| Forward currency contracts | 9,359,323 | 16,059,481 |
| Securities lending cash collateral | 93,088,584 | 288,542,319 |
| Total investments - fair value | 2,613,381,473 | 3,258,896,760 |
| **Total assets** | 3,294,831,376 | 3,571,534,235 |
| **Liabilities and net position** | | |
| Liabilities | | |
| Due to brokers - net | 135,551,728 | 214,140,603 |
| Refunds, professional fees payable and other liabilities | 4,868,168 | 4,756,524 |
| OPEB liability | 2,373,859 | 2,080,467 |
| Securities lending cash collateral | 93,088,584 | 288,542,319 |
| **Total liabilities** | 235,882,339 | 509,519,913 |
| **Net Position - Restricted for Pension Benefits** | $ 3,058,949,037 | $ 3,062,014,322 |

## Statement of Changes in Fiduciary Net Position
## Years Ended December 31, 2015, and 2014

| | 2015 | 2014 |
|---|---|---|
| **Additions**[1] | | |
| Contributions | | |
| Employer [1] | $ 572,836,100 | $ 177,417,827 |
| Plan Member | 107,626,311 | 95,675,538 |
| Other | 3,091,545 | 740,305 |
| Total Contributions | 683,553,956 | 273,833,670 |
| Investment Income | | |
| Net appreciation in fair value of investments | (51,940,312) | 136,126,859 |
| Interest | 19,171,732 | 19,452,054 |
| Dividends | 28,870,113 | 31,592,777 |
| Real estate operating income - net | 7,159,475 | 3,547,612 |
| | 3,261,008 | 190,719,302 |
| Less investment expenses | (9,313,790) | (9,983,702) |
| Investment income - net | (6,052,782) | 180,735,600 |
| Securities lending | | |
| Income | 776,834 | 984,565 |
| Lender (borrower) rebates | 121,757 | 429,565 |
| Management fees | (179,604) | (248,437) |
| Securities lending income - net | 718,987 | 1,165,693 |
| **Total additions** | 678,220,161 | 455,734,963 |
| **Deductions** | | |
| Benefits [1] | 668,950,080 | 645,688,934 |
| Refund Payments | 7,826,847 | 8,991,636 |
| Administrative and OPEB expenses | 4,508,519 | 4,240,625 |
| **Total deductions** | 681,285,446 | 658,921,195 |
| **Net increase** | (3,065,285) | (203,186,232) |
| **Net Position Restricted for Pension Benefits** | | |
| Beginning of year | 3,062,014,322 | 3,265,200,554 |
| End of year | $ 3,058,949,037 | $ 3,062,014,322 |

[1] *Excludes $9,441,534 paid for health insurance supplement in 2015 and $9,657,123 paid in 2014.*

# SECTION C

## REQUIRED SUPPLEMENTARY INFORMATION

Auditor's Note: This information is intended to assist in preparation of the financial statements of the Policemen's Annuity and Benefit Fund Of Chicago. Financial statements are the responsibility of management, subject to the auditor's review. Please let us know if the auditor recommends any changes.

## Schedule of Changes in Net Pension Liability and Related Ratios Current Period

## Fiscal Year Ended December 31, 2015

| | | |
|---|---|---|
| **A. Total Pension Liability** | | |
| 1. Service Cost Including Pension Plan Administrative Expense | $ | 213,584,647 |
| 2. Interest on the Total Pension Liability | | 832,972,131 |
| 3. Changes of benefit terms | | - |
| 4. Difference between expected and actual experience of the Total Pension Liability | | (105,968,891) |
| 5. Changes of assumptions | | - |
| 6. Benefit payments, including refunds of employee contributions | | (676,776,927) |
| 7. Pension Plan Administrative Expenses | | (4,508,519) |
| 8. Net change in total pension liability | | 259,302,441 |
| 9. Total pension liability – beginning | | 11,773,430,559 |
| 10. Total pension liability – ending | **$** | **12,032,733,000** |
| **B. Plan Fiduciary Net Position** | | |
| 1. Contributions – employer | | 572,836,100 |
| 2. Contributions – employee | | 107,626,311 |
| 3. Net investment income | | (5,333,795) |
| 4. Benefit payments, including refunds of employee contributions | | (676,776,927) |
| 5. Pension Plan Administrative Expense | | (4,508,519) |
| 6. Other | | 3,091,545 |
| 7. Net change in plan fiduciary net position | | (3,065,285) |
| 8. Plan fiduciary net position – beginning | | 3,062,014,322 |
| 9. Plan fiduciary net position – ending | **$** | **3,058,949,037** |
| **C. Net Pension Liability** | **$** | **8,973,783,963** |
| **D. Plan Fiduciary Net Position as a Percentage of the Total Pension Liability** | | **25.42%** |
| **E. Covered-Employee Payroll** | **$** | **1,086,607,979** |
| **F. Net Pension Liability as a Percentage of Covered Employee Payroll** | | **825.85%** |

## SCHEDULES OF REQUIRED SUPPLEMENTARY INFORMATION

## SCHEDULE OF CHANGES IN NET PENSION LIABILITY AND RELATED RATIOS MULTIYEAR

| Fiscal year ending December 31, | 2015 | 2014 |
|---|---|---|
| **Total Pension Liability** | | |
| Service Cost Including Pension Plan Administrative Expense | $ 213,584,647 | $ 199,435,084 |
| Interest on the Total Pension Liability | 832,972,131 | 791,693,017 |
| Benefit Changes | - | - |
| Difference between Expected and Actual Experience | (105,968,891) | - |
| Assumption Changes | - | 845,070,287 |
| Benefit Payments | (668,950,080) | (645,688,934) |
| Refunds | (7,826,847) | (8,991,636) |
| Pension Plan Administrative Expense | (4,508,519) | (4,240,625) |
| **Net Change in Total Pension Liability** | 259,302,441 | 1,177,277,193 |
| **Total Pension Liability - Beginning** | 11,773,430,559 | 10,596,153,366 |
| **Total Pension Liability - Ending (a)** | $ 12,032,733,000 | $ 11,773,430,559 |
| **Plan Fiduciary Net Position** | | |
| Employer Contributions | 572,836,100 | 177,417,827 |
| Employee Contributions | 107,626,311 | 95,675,538 |
| Pension Plan Net Investment Income | (5,333,795) | 181,901,293 |
| Benefit Payments | (668,950,080) | (645,688,934) |
| Refunds | (7,826,847) | (8,991,636) |
| Pension Plan Administrative Expense | (4,508,519) | (4,240,625) |
| Other | 3,091,545 | 740,305 |
| **Net Change in Plan Fiduciary Net Position** | (3,065,285) | (203,186,232) |
| **Plan Fiduciary Net Position - Beginning** | 3,062,014,322 | 3,265,200,554 |
| **Plan Fiduciary Net Position - Ending (b)** | $ 3,058,949,037 | $ 3,062,014,322 |
| **Net Pension Liability - Ending (a) - (b)** | 8,973,783,963 | 8,711,416,237 |
| **Plan Fiduciary Net Position as a Percentage of Total Pension Liability** | 25.42% | 26.01% |
| **Covered Employee Payroll** | $ 1,086,607,979 | $ 1,074,333,318 |
| **Net Pension Liability as a Percentage of Covered Employee Payroll** | 825.85% | 810.87% |

*Ten fiscal years will be built prospectively.*
*Please see the following page for additional notes relating to the Schedule of Changes in Net Pension Liability and Related Ratios.*

## SCHEDULES OF REQUIRED SUPPLEMENTARY INFORMATION
## ADDITIONAL NOTES TO THE SCHEDULE OF CHANGES IN NET PENSION LIABILITY AND RELATED RATIOS MULITIYEAR

Beginning of year total pension liability for fiscal year 2015 used a Single Discount Rate of 7.15% and the benefit provisions and funding policy in effect as of the December 31, 2014, funding valuation. The Single Discount Rate of 7.15% was based on a long-term expected rate of return on pension plan investments of 7.50% used in the December 31, 2014, funding valuation for the years 2015 through 2063 and a long-term municipal bond rate as of December 31, 2014, of 3.56% for subsequent years.

End of year total pension liability for fiscal year 2015 uses a Single Discount Rate of 7.15% and the benefit provisions and funding policy in effect as of the December 31, 2015, funding valuation. The Single Discount Rate of 7.15% was based on a long-term expected rate of return on pension plan investments of 7.50% used in the December 31, 2015, funding valuation and a long-term municipal bond rate as of December 30, 2015, of 3.57% for subsequent years.

The increase in the total pension liability for fiscal year 2015 reflects the change in the long-term municipal bond rate from 3.56% as of December 31, 2014, to 3.57% as of December 30, 2015. This change was measured at the end of the year using a Single Discount Rate of 7.15%. There were no changes in assumptions, methods, plan provisions or statutory funding policy during plan year ending December 31, 2015. This report does not reflect PA 99-0506 which was passed on May 30, 2016, and significantly defers the level of plan sponsor required contributions.

# Schedules of Required Supplementary Information
## Schedule of the Net Pension Liability Multiyear

| FY Ending December 31, | Total Pension Liability | Plan Net Position | Net Pension Liability | Plan Net Position as a % of Total Pension Liability | Covered Payroll* | Net Pension Liability as a % of Covered Payroll |
|---|---|---|---|---|---|---|
| 2014 | $ 11,773,430,559 | $ 3,062,014,322 | $ 8,711,416,237 | 26.01% | $ 1,074,333,318 | 810.87% |
| 2015 | 12,032,733,000 | 3,058,949,037 | 8,973,783,963 | 25.42% | 1,086,607,979 | 825.85% |

* *Covered payroll is the amount in force as of the valuation date and likely differs from actual payroll paid during the fiscal year.*

*Ten fiscal years will be built prospectively.*

# SCHEDULE OF CONTRIBUTIONS MULTIYEAR
## LAST 10 FISCAL YEARS

| FY Ending December 31, | Actuarial Determined Contribution* | Actual Contribution | Contribution Deficiency (Excess) | Covered Payroll** | Actual Contribution as a % of Covered Payroll | Statutory Contribution*** |
|---|---|---|---|---|---|---|
| 2006 | $ 262,657,025 | $ 150,717,705 | $ 111,939,321 | $ 1,012,983,634 | 14.88% | $157,591,000 |
| 2007 | 312,726,608 | 170,598,268 | 142,128,341 | 1,038,957,026 | 16.42% | 170,112,293 |
| 2008 | 318,234,870 | 172,835,805 | 145,399,065 | 1,023,580,667 | 16.89% | 175,080,814 |
| 2009 | 339,488,187 | 172,043,784 | 167,444,403 | 1,011,205,359 | 17.01% | 177,333,569 |
| 2010 | 363,624,570 | 174,500,507 | 189,124,063 | 1,048,084,301 | 16.65% | 177,060,837 |
| 2011 | 402,751,961 | 174,034,600 | 228,717,361 | 1,034,403,526 | 16.82% | 176,068,606 |
| 2012 | 431,010,173 | 197,885,552 | 233,124,621 | 1,015,170,686 | 19.49% | 204,329,314 |
| 2013 | 474,177,604 | 179,521,259 | 294,656,345 | 1,015,426,128 | 17.68% | 182,716,690 |
| 2014 | 491,651,208 | 178,158,132 | 313,493,076 | 1,074,333,318 | 16.58% | 178,773,877 |
| 2015 | 785,500,836 | 575,927,645 | 209,573,191 | 1,086,607,979 | 53.00% | 583,421,466 |

** The PABF Statutory Funding does not conform to Actuarial Standards of Practice; therefore, the 2015 actuarially determined contribution is equal to the normal cost plus a 30-year closed level dollar amortization of the unfunded actuarial liability. Prior to 2015 the actuarially determined contribution was equal to the "ARC" which was equal to the normal cost plus a 30-year open level percent amortization of the unfunded actuarial liability.*

*** Covered payroll shown is the amount in force as of the valuation date and likely differs from actual payroll paid during the fiscal year.*

**** Excludes amounts paid for health insurance supplement beginning in 2006.*

# NOTES TO SCHEDULE OF CONTRIBUTIONS

| | |
|---|---|
| **Valuation Date:** | December 31, 2015 |
| Notes | Statutory contribution rates are calculated as of December 31, which is 12 months prior to the end of the fiscal year in which contributions are reported. |

**Methods and Assumptions Used to Determine Contribution Rates as of the Valuation Date:**

| | |
|---|---|
| Actuarial Cost Method | Projected Unit Credit |
| Amortization Method | Prior to 2015, the total City contribution is generated by a tax equal to 2.00 times the contributions by the policemen to the Fund two years prior to the year of the tax levy. Beginning in tax levy year 2015, the Statutory Contributions are equal to a level percentage of pay contribution determined so that the Plan attains a 90 percent funded ratio by the end of 2040 on an open group basis. |
| Remaining Amortization Period | Not Applicable. An amortization payment is not directly calculated. The amortization payment is the difference between the total statutory contribution and the employer normal cost contribution. |
| Asset Valuation Method | 5-year smoothed market |
| Inflation | 3.00 percent |
| Salary Increases | Salary increase rates based on age-related productivity and merit rates plus inflation. |
| Postretirement Benefit Increases | A retiree born before January 1, 1955, with at least 20 years of service or receiving a mandatory retirement minimum annuity, receives an increase of 3 percent of the original annuity, starting on the first of the month following the first anniversary of his retirement or the first of the month following attainment of age 55, whichever is later, and shall not be subject to a 30 percent maximum increase. For retirees born after January 1, 1955, automatic increases are 1.5 percent of the original annuity, commencing at age 60, or the first anniversary of retirement, if later, to a maximum of 30 percent. For participants that first became members on or after January 1, 2011, increases are equal to the lesser of 3.00 percent and 50 percent of CPI-U of the original benefit, commencing at age 60. |
| Investment Rate of Return | 7.50 percent as of the December 31, 2015, valuation. |
| Retirement Age | Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the December 31, 2014, actuarial valuation pursuant to an experience study of the period January 1, 2009, through December 31, 2013. |
| Mortality | Post-Retirement Healthy mortality rates: Sex distinct Retirement Plans 2014 Healthy Annuitant mortality table weighted 108% for males and 97% for females. Pre-Retirement mortality rates: Sex distinct Retirement Plans 2014 Total Employee mortality table weighted 85% for males and 115% for females. Disabled Mortality: Sex distinct Retirement Plans 2014 Healthy Annuitant mortality table weighted 115% for males and 115% for females. |

**Other Information:**

| | |
|---|---|
| Notes | The valuation is based on the statutes in effect as of December 31, 2015, and does not consider the impact of PA 99-0506 which was passed on May 30, 2016. |

**Methods and Assumptions Used for Accounting Purposes as of the Valuation Date:**

| | |
|---|---|
| Actuarial Cost Method | Entry Age Normal |
| Discount Rate | 7.15 percent as of the December 31, 2014, valuation.<br>7.15 percent as of the December 31, 2015, valuation. |

# SECTION D

## NOTES TO FINANCIAL STATEMENTS

Auditor's Note: This information is intended to assist in preparation of the financial statements of the Policemen's Annuity and Benefit Fund Of Chicago. Financial statements are the responsibility of management, subject to the auditor's review. Please let us know if the auditor recommends any changes.

## Single Discount Rate

A Single Discount Rate of 7.15% was used to measure the total pension liability. This Single Discount Rate was based on an expected rate of return on pension plan investments of 7.50% and a municipal bond rate of 3.57%. The projection of cash flows used to determine this Single Discount Rate assumed that plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the difference between the statutory contribution rates and the member rate. Based on these assumptions, the pension plan's fiduciary net position and future contributions were sufficient to finance the benefit payments only through the year 2063. As a result, the long-term expected rate of return on pension plan investments was applied to projected benefit payments through the year 2063, and the municipal bond rate was applied to all benefit payments after that date.

Regarding the sensitivity of the net pension liability to changes in the Single Discount Rate, the following presents the plan's net pension liability, calculated using a Single Discount Rate of 7.15%, as well as what the plan's net pension liability would be if it were calculated using a Single Discount Rate that is one percent lower or one percent higher:

### SENSITIVITY OF NET PENSION LIABILITY TO THE SINGLE DISCOUNT RATE ASSUMPTION

| 1% Decrease 6.15% | Discount Rate Assumption 7.15% | 1% Increase 8.15% |
|---|---|---|
| $ 10,402,347,972 | $ 8,973,783,963 | $ 7,771,126,657 |

## SUMMARY OF POPULATION STATISTICS

| | |
|---|---|
| Inactive Plan Members or Beneficiaries Currently Receiving Benefits | 13,210 |
| Inactive Plan Members Entitled to But Not Yet Receiving Benefits | 637 |
| Active Plan Members | 12,061 |
| Total Plan Members | 25,908 |

*Additional information about the member data used is included in the December 31, 2015, actuarial valuation report.*

# SECTION E

## SUMMARY OF BENEFITS

# PLAN DESCRIPTION (AS OF DECEMBER 31, 2015)

***PARTICIPANTS***

An employee in the police department of the City of Chicago appointed and sworn or designated by law as a peace officer with the title of policeman, policewoman, chief surgeon, police surgeon, police dog catcher, police kennelman, police matron and members of the police force of the police department.

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***SERVICE***

In computing service rendered by a police officer, the following periods shall be counted, in addition to all periods during which he performed the duties of his position, as periods of service for annuity purposes only: All periods of (a) vacation; (b) leave of absence with pay; (c) military service; (d) disability for which the police officer receives disability benefit. The calculation of service is based on a day-to-day basis for most purposes. For the purpose of calculating benefits under the Dominant Formula, one-year of Service is credited for a year in any portion of which a police officer is compensated.

---

***RETIREMENT***

***Eligibility***

Attainment of age 50 with at least 10 years of service.

*For participants that first became members on or after January 1, 2011, attainment of age 55 with at least 10 years of service. Participants may retire at attainment of age 50 with 10 years of service with a reduced benefit.*

***Mandatory***

Effective in plan year 2003, retirement is mandatory for a participant who has attained age 63.

***Accumulation Annuity***

At age 50 or more, with 10 or more years of service, the employee is entitled to an annuity based on the sums accumulated for age and service annuity plus 1/10 of the sum accumulated from the contributions by the City for the age and service annuity for each completed year of service after the first 10 years. At age 50 or more with 20 or more years, the employee is entitled to an annuity based on all sums accumulated.

***Formula Minimum Annuity***

While there are several alternative formulas available with 20 or more years of service, the Dominant Formula is 50% of highest average salary (including duty availability pay) in 48 consecutive months within the last 10 years of service plus 2.5% for each year or fraction of service over 20 years, limited to 75% of average salary.

***Mandatory Retirement Minimum Annuity***

A police officer who is required to withdraw from service due to attainment of mandatory retirement age who has less than 20 years of service credit may elect to receive an annuity equal to 30% of average salary for the first 10 years of service, plus 2% of average salary for each completed year of service in excess of 10, to a maximum of 48% of average salary. This benefit qualifies for post retirement increases.

***Post-Retirement Increase***

A retiree born before January 1, 1955, with at least 20 years of service or receiving a mandatory retirement minimum annuity, receives an increase of 3% of the original annuity, starting on the first of the month following the first anniversary of his retirement or the first of the month following attainment of age 55, whichever is later, and shall not be subject to a 30% maximum increase. For retirees born after January 1, 1955, automatic increases are 1.5% of the original annuity, commencing at age 60, or the first anniversary of retirement, if later, to a maximum of 30%.

*For participants that first became members on or after January 1, 2011, increases are equal to the lesser of 3.00% and 50% of CPI-U of the original benefit, commencing at age 60.*

***Minimum Annuity***

The benefit of any retiree who retired from the service before January 1, 1986, at age 50 or over with at least 20 years of service, or due to termination of disability is not less than $1,050 per month.

*For participants that first became members on or after January 1, 2011, the member is entitled to an annuity based on an accrual rate of 2.5% of the final average salary for each fraction of service. Maximum is 75% of the final average salary. Final average salary is calculated using salary from the eight highest consecutive years within the last 10 years of service prior to retirement. Pensionable salary is limited to $106,800 in 2011, increased by the lesser of 3% and one-half of the annual unadjusted percentage increase in the Consumer Price Index-U (but not less than zero) as measured in the preceding 12- month period ending with the September preceding the November 1, which is the date that the new amount will be calculated and made available to the pension funds.*

*For participants that first became members on or after January 1, 2011, who retire after age 50 but before age 55 is attained, the member is entitled to an annuity based on an accrual rate of 2.5% of the final average salary for each fraction of service, reduced by one half of one percent per month for retirement prior to age 55, subject to a maximum benefit of 75%.*

***Reversionary Annuity*** A member, prior to retirement, may elect to reduce his own annuity, and provide a reversionary annuity, to begin upon the officer's death, for the officer's spouse.

---

***SURVIVOR INCOME BENEFITS PAYABLE ON DEATH***

***Death in Service (Non-Duty):*** Generally, a money-purchase benefit is provided, based on total salary deductions and City contributions. However, if a policeman dies in service after December 31, 1985, with at least 1.5 years of service, the widow's annuity is the greater of (a) 30% of the annual maximum salary attached to the classified civil service position of a first class patrolman at the time of his death (without dollar limit) or (b) 50% of the benefit accrued by the policeman at date of death.

The lifetime benefit is payable until death.

***Death in Service (Duty Related)***

***Compensation Annuity*** 75% of the member's salary attached to the civil service position that would ordinarily have been paid to such member as though in active discharge of his duties at the time of death payable until the date the policeman would have attained age 63.

***Supplemental Annuity*** Payable for life and is equal to the difference between the money purchase annuity for the spouse and an amount equal to 75% of the annual salary (including all salary increases and longevity raises) the police officer would have been receiving when he attained age 63 if the police officer had continued in service at the same rank last held in the department.

***Death after Retirement*** If a police officer retires on or after January 1, 1986, and subsequently dies, the widow's annuity is 40% before 1988 and 50% on and after January 1, 1988 of the retired policeman's annuity at the time of death (without dollar limit).

***Maximum Annuity*** $500 a month (after discount for age difference) under both the accumulation method and the old formula method. There is no dollar limit on the 30%, 40% or 50% benefit.

| | |
|---|---|
| ***Minimum Annuity*** | Any spouse is entitled to a minimum annuity of $1,000 a month.<br><br>*For participants that first became members on or after January 1, 2011, widow benefits are equal to 66-2/3% of the officer's earned annuity at the date of death. Automatic increases to the annuity are equal to the lesser of 3.00% and 50% of CPI-U, commencing when the survivor reaches age 60, and applied to the original granted retirement annuity.* |

***CHILDREN'S ANNUITIES***

| | |
|---|---|
| ***Eligibility*** | Payable at death of the policeman to all unmarried children less than 18 years of age. |
| ***Benefit*** | 10% of the annual maximum salary of a first class patrolman during widow (widower) life, 15% otherwise. |
| ***Payable Until*** | Age 18. If the child is disabled, benefit is payable for life or as long as such disablement exists. |
| ***Family Maximum*** | 60% (non-duty death) or 100% (duty death) of the salary that would ordinarily been paid to the policeman, if he had been in the active discharge of his duties. |
| ***Parent's Annuities***<br>***Eligibility*** | Payable to a dependent parent at the death of a policeman who is in either active service, or receiving a disability benefit, or on leave of absence, or in receipt of an annuity granted after 20 years of service, or waiting to start receiving an annuity granted for 20 years of service. The benefit is only payable if there are no surviving spouses or children eligible for benefits. |
| ***Benefit*** | 18% of the current salary attached to the rank at separation from service. |
| ***Payable until*** | Death of the dependent parent. |

***DUTY DISABILITY BENEFIT***

| | |
|---|---|
| ***Eligibility*** | Disabling condition incurred in the performance of duty. |

| | |
|---|---|
| ***Benefit*** | 75% of salary at the time the disability is allowed plus $100.00 per month for each unmarried child less than age 18, (total amount of child's benefits shall not exceed 25% of salary). Beginning January 1, 2000, after 7 years of payment, the benefit shall not be less than 60% of the current salary attached to the rank held by the policemen at the time of disability. Payable to employee's age 63 or by operation of law, whichever is later. Salary deductions are contributed by the City. |

***OCCUPATIONAL DISEASE DISABILITY BENEFIT***

| | |
|---|---|
| ***Eligibility*** | Heart attack or any disability heart disease after 10 years of service. |
| ***Benefit*** | 65% of salary attached to the rank held by the police officer at the time of his or her removal from the police department payroll with a minimum after 10 years of 50% of the current salary attached to the rank. Each natural or legally adopted unmarried child of the officer under the age of 18 is entitled to a benefit of $100 per month. This benefit is not terminated at age 18 if the child is then dependent by reason of physical or mental disability. Salary deductions are contributed by the City. |

***ORDINARY DISABILITY BENEFIT***

| | |
|---|---|
| ***Eligibility*** | Disabling condition other than duty or occupational related. |
| ***Benefit*** | 50% of salary at the time of injury, payable for a period not more than 25% of service (excluding any previous disability time) rendered prior to injury, nor more than 5 years. Disability shall cease at age 63. Salary deductions are contributed by the City. |

***DEATH BENEFIT***

| | |
|---|---|
| ***Eligibility*** | Payable upon the death of a police officer whose death occurs while in active service; on authorized leave of absence; within 60 days of receipt of salary; while receiving duty or ordinary disability benefit; occurring within 60 days of termination of such benefit; or occurring on retirement while in receipt of annuity and separation was effective after 20 years of service. This benefit is payable to beneficiaries or, if none, to estate. |

***Benefit***

***Death in Service:***

| AGE AT DEATH | BENEFIT |
|---|---|
| 49 and under | $12,000 |
| 50-62 | $12,000 less $400 for each year by which age at death exceeds 49 |

***Death after Retirement:***

| AGE AT DEATH | BENEFIT |
|---|---|
| 50 and over | $6,000 |

If death results from injury incurred in performance of duty before retirement on annuity, the benefit payable is $12,000 regardless of the attained age.

---

***GROUP HEALTH HOSPITAL AND SURGICAL INSURANCE PROGRAM***

The pension fund shall provide payments in the amount of $95 per month for non-Medicare eligible city annuitants and $65 per month for Medicare eligible city annuitants through December 31, 2016.

---

***REFUNDS***

***Policemen***

Without regard to service and under age 50, or with less than 10 years of service and under age 57 at withdrawal: a refund of all salary deductions together with 1.5% simple interest until the date of withdrawal.

***For Spouse's Annuity***

Upon retirement an unmarried policeman will receive a refund of contributions for spouse's annuity, accumulated at 3% compounded annually.

***Of Remaining Amounts***

If at death of a retired policeman the total member contributions paid while active exceed the total retirement benefits paid to date of death, the difference is payable.

---

***CONTRIBUTIONS***

***Salary Deductions***

| | |
|---|---|
| Employee | 7 % |
| Spouse | 1½% |
| Annuity Increase | ½% |
| | 9 % |

`

***City Contributions*** [1]

| | | |
|---|---|---|
| Employee | 9-5/7% | |
| Spouse | 2% | |
| Annuity Increase | ½% | Unallocated |
| | 12-3/14% | |

[1] *Credited to Participant's Accumulation Annuity and Widow's Annuity Account*

In addition to the above contributions, a contribution is made to support the Death Benefit. Policemen contribute $2.50 per month. City contributes a total of $224,000 for all policemen.

Prior to 2015, the total City contribution is generated by a tax equal to double the contributions by the policemen to the Fund two years prior to the year of the tax levy.

Starting in tax levy year 2015, employer contributions combined with member contributions and other fund revenue must be equal to the amount, as a level percentage of payroll, that is sufficient to produce 90% funding by the end of fiscal year 2040.

***"PICK UP" OF EMPLOYEE SALARY DEDUCTIONS***

Beginning January 1, 1982, the employee contributions were "picked up" by the employer. The W-2 salary is therefore reduced by the amount of contribution. For pension purposes the salary remains unchanged. Income tax will be paid when a refund or annuity is received. For the purpose of benefits, refunds or contributions, these contributions will be treated as employee contributions.

***SALARY CAP AND COLA DEVELOPMENT FOR MEMBERS HIRED ON OR AFTER JANUARY 1, 2011***

| Year Ending | CPI-U | ½ CPI-U | COLA | Maximum Annual Pensionable Earnings |
|---|---|---|---|---|
| 2011 | | | 3.00% | $106,800.00 |
| 2012 | 3.90% | 1.95% | 1.95% | $108,882.60 |
| 2013 | 2.00% | 1.00% | 1.00% | $109,971.43 |
| 2014 | 1.20% | 0.60% | 0.60% | $110,631.26 |
| 2015 | 1.70% | 0.85% | 0.85% | $111,571.63 |
| 2016 | 0.00% | 0.00% | 0.00% | $111,571.63 |

# SECTION F

## ACTUARIAL COST METHOD AND ACTUARIAL ASSUMPTIONS

## I. ACTUARIAL COST METHOD

An Actuarial Cost Method is a set of techniques used by the actuary to develop contribution levels under a retirement plan. The Actuarial Cost Method used in this valuation for statutory funding and State reporting purposes is the Projected Unit Credit cost method. The Actuarial Cost Method used for GASB accounting purposes is the Entry Age Normal cost method.

Under the Projected Unit Credit Cost Method, each participant's projected benefit is allocated in proportion to service as of the valuation date. The Actuarial Accrued Liability is the present value of the portion of benefits allocated for periods of service as of the valuation date. The Normal Cost is the present value of the benefits allocated for service during the current plan year.

Under the Entry Age Normal Cost Method, each participant's projected benefit is allocated on a level percent of pay basis from entry age to assumed exit age. The Actuarial Accrued Liability is the portion of the present value associated with pay prior to the valuation date. The Normal Cost is the portion of the present value associated with pay during the current plan year.

To the extent that current assets and future Normal Costs do not support participants' expected future benefits, an Unfunded Actuarial Accrued Liability ("UAAL") develops. The UAAL is generally amortized over a fixed period of time (e.g., 30 years) from the date incurred. The total contribution developed under this method is the sum of the Normal Cost and the payment toward the UAAL.

## II. CURRENT ACTUARIAL ASSUMPTIONS

The current actuarial assumptions were adopted and became effective December 31, 2014, and were based on an experience study for the period January 1, 2009, to December 31, 2013.

### *A. Demographic Assumptions*

Mortality:

**Pre-Retirement mortality rates:** Sex distinct Retirement Plans 2014 Total Employee mortality table weighted 85% for males and 115% for females.

**Post-Retirement Healthy mortality rates:** Sex distinct Retirement Plans 2014 Healthy Annuitant mortality table weighted 108% for males and 97% for females. When compared to observed experience, the recommended rates include a 23% margin for future mortality improvements.

Disabled Mortality:

Sex distinct Retirement Plans 2014 Healthy Annuitant mortality table weighted 115% for males and 115% for females.

Rate of Disability: Rates at which members are assumed to become disabled under the provisions of the Fund. Sample rates assumed are as follows:

| **Attained Age** | **Rate** |
|---|---|
| 22 | .0003 |
| 27 | .0007 |
| 32 | .0007 |
| 37 | .0020 |
| 42 | .0030 |
| 47 | .0040 |
| 52 | .0050 |
| 57 | .0060 |
| 62 | .0060 |

The assumed distribution of disability types is assumed to be as follows:

| | |
|---|---|
| Duty Disability | 55% |
| Occupational Disease Disability | 10% |
| Ordinary Disability | 35% |

Rate of Retirement: Rates at which members are assumed to retire under the provisions of the Fund. The rates assumed are as follows:

For members hired before January 1, 2011:

| **Attained Age** | **Rate** [1] |
|---|---|
| 50 | .05 |
| 51 | .05 |
| 52 | .05 |
| 53 | .05 |
| 54 | .05 |
| 55 | .19 |
| 56 | .19 |
| 57 | .19 |
| 58 | .25 |
| 59 | .25 |
| 60 | .25 |
| 61 | .30 |
| 62 | .30 |
| 63 | 1.00 |

[1] *Only for members eligible for a formula annuity.*

For members hired on or after January 1, 2011:

| Attained Age | Rate [1] |
|---|---|
| 50 | .02 |
| 51 | .02 |
| 52 | .02 |
| 53 | .02 |
| 54 | .03 |
| 55 | .21 |
| 56 | .21 |
| 57 | .21 |
| 58 | .27 |
| 59 | .27 |
| 60 | .25 |
| 61 | .30 |
| 62 | .30 |
| 63 | 1.00 |

[1] *Only for members eligible for a formula annuity.*

Turnover Rates: The following sample rates exemplify the table:

| Years of Service | Rate |
|---|---|
| 0 | 0.030 |
| 1 | 0.028 |
| 2 | 0.020 |
| 3 | 0.015 |
| 4-5 | 0.010 |
| 6-10 | 0.009 |
| 11 | 0.008 |
| 12 | 0.007 |
| 13-24 | 0.006 |

***B. Economic Assumptions***

Investment Return Rate: 7.50% per annum for pensions effective as of December 31, 2014, and 4.50% for OPEB effective as of December 31, 2005.

General Inflation: The 7.50% Investment Return Rate assumption contains a 3.00% inflation assumption and a 4.50% real rate of return assumption for pension.

Future Salary Increases: Assumed rates of individual salary increase at 3.75% per year, plus an additional percentage based on the following service scale:

| Completed Years of Service * | Scale |
|---|---|
| 1 | 0.3625 |
| 2 | 0.0325 |
| 3 | 0.0325 |
| 4 | 0.0325 |
| 5 | 0.0225 |
| 6-9 | 0.0000 |
| 10 | 0.0225 |
| 11-14 | 0.0000 |
| 15 | 0.0225 |
| 16-19 | 0.0000 |
| 20 | 0.0225 |
| 21-24 | 0.0000 |
| 25 | 0.0225 |
| 26-29 | 0.0000 |
| 30 | 0.0225 |
| Over 30 | 0.0000 |

* *Includes increases at 12 and 18 months of service.*

Asset Value: For Book-value of Assets, bonds are at amortized value and stocks are at cost.

For statutory funding, the actuarial value of assets is smoothed by recognizing each year's difference between actual and expected investment return at the rate of 20% per year over a five-year period.

The actuarial value of assets was marked to the market value as of January 1, 2012, and is smoothed by using a five-year phase-in of each year's unexpected investment gains and losses.

### *C. Other Assumptions*

Marital Status: It is assumed that 85% of members have an eligible spouse. The male spouse is assumed to be three years older than the female spouse. No assumption is made about other dependents.

Group Health Insurance: Due to P. A. 98-0043 effective June 28, 2013, it is assumed for valuation purposes that the health insurance supplement in effect prior to June 30, 2013, will end on December 31, 2016, for all employee annuitants (and their future surviving spouses). The amount of the Plan paid health insurance from July 1, 2008, until June 30, 2016, is $95.00 per month for each annuitant (employees and surviving spouses) not qualified to receive Medicare benefits, and $65.00 if qualified. It is assumed that all annuitants age 65 and older will be eligible for Medicare and all annuitants less than age 65 will not be eligible for Medicare. Future widows of retirees are assumed to be eligible for Medicare, as well as widow annuitants that are currently receiving a health insurance supplement.

The projections under the provisions of P.A. 96-1495 were based on the following assumptions and methods:

**Population:** Active members who terminate, retire, become disabled or die during the year are replaced by new entrants such that the number of active members remains level during the projection period based on the most recent actuarial valuation. The number of active members as of the valuation at December 31, 2015 is 12,061.

**New Entrant Profile:**

(1) The entry age of future new entrants, which is summarized below, is based on the profile of current active members hired over the last five years with one or more years of service as of December 31, 2015. These members were hired from January 1, 2011, through December 31, 2014.

| Entry Age | Number |
|---|---|
| 20 to 25 | 79 |
| 25 to 30 | 696 |
| 30 to 35 | 364 |
| 35 to 40 | 162 |
| 40 to 45 | 4 |

(2) Approximately 80% of the new entrants are assumed to be male.

(3) Based on the most recent employment contract, new entrants were assumed to earn $46,668 for the plan year ending December 31, 2015. This amount does not include duty availability pay. The new entrant pay for members hired after 2015 is assumed to increase by the wage inflation assumption of 3.75% plus duty availability pay after 3 years, increased by CPI compounded.

(4) Pay for a specific new entrant is assumed to increase in the future by the wage inflation and the service based increases disclosed in this actuarial valuation.

(5) The projections assume a pay cap of $111,572 for plan year 2015, increasing by 1.5% per year after plan year 2015. The annual increase of 1.5% per year is based on 50% of the CPI-U increase which is assumed to be 3.0% per year.

**Administrative Expenses:** Statutory funding projections include an explicit administrative expense assumption of $4,509,000 for plan year end December 31, 2015, increased by 3.0% per year.

# SECTION G

## CALCULATION OF THE SINGLE DISCOUNT RATE

## CALCULATION OF THE SINGLE DISCOUNT RATE

GASB Statement Nos. 67 and 68 includes a specific requirement for the discount rate that is used for the purpose of the measurement of the Total Pension Liability. This rate considers the ability of the fund to meet benefit obligations in the future. To make this determination, employer contributions, employee contributions, benefit payments, expenses and investment returns are projected into the future. The Plan Net Position (assets) in future years can then be determined and compared to its obligation to make benefit payments in those years. As long as assets are projected to be on hand in a future year, the assumed valuation discount rate is used. In years where assets are not projected to be sufficient to meet benefit payments, the use of a municipal bond rate is required, as described in the following paragraph.

The Single Discount Rate ("SDR") is equivalent to applying these two rates to the benefits that are projected to be paid during the different time periods. The SDR reflects (1) the long-term expected rate of return on pension plan investments (during the period in which the fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating (which is published by the Federal Reserve) as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is 7.50%; the municipal bond rate is 3.57%; and the resulting Single Discount Rate is 7.15%.

The sponsor finances benefits using a funding policy defined in state statutes. Sponsor contributions are equal to a level percentage of pay contribution determined so that the Plan attains a 90% funded ratio by the end of 2040 on an open group basis. The statutory contribution does not explicitly separate projected employer contributions between current plan members and future plan members.

For purposes of developing the Single Discount Rate, we have projected actuarial liabilities on an Entry Age Normal basis, and compared against projected market value of assets. We have assumed the actuarial liability for future member will be fully financed, to the extent that assets are available, any remaining asset will be assigned to current plan members. Based on this assignment of assets and employer contributions, plan assets assigned to current members are projected to be depleted by 2064.

After assets are depleted in plan year 2062, the plan sponsor is assumed to make pay-as-you-as-go contributions equal to benefits and expenses during the year.

The tables in this section provide background for the development of the Single Discount Rate.

The following tables show the assignment of assets and employer contributions and the projection of assets for current members as of the valuation date. Our projections assume the sponsor will make the required statutory contributions. The projections are based on the statutory funding projections performed during the December 31, 2015, actuarial valuation.

# PROJECTION OF FUNDED STATUS AND ASSIGNMENT OF ASSETS

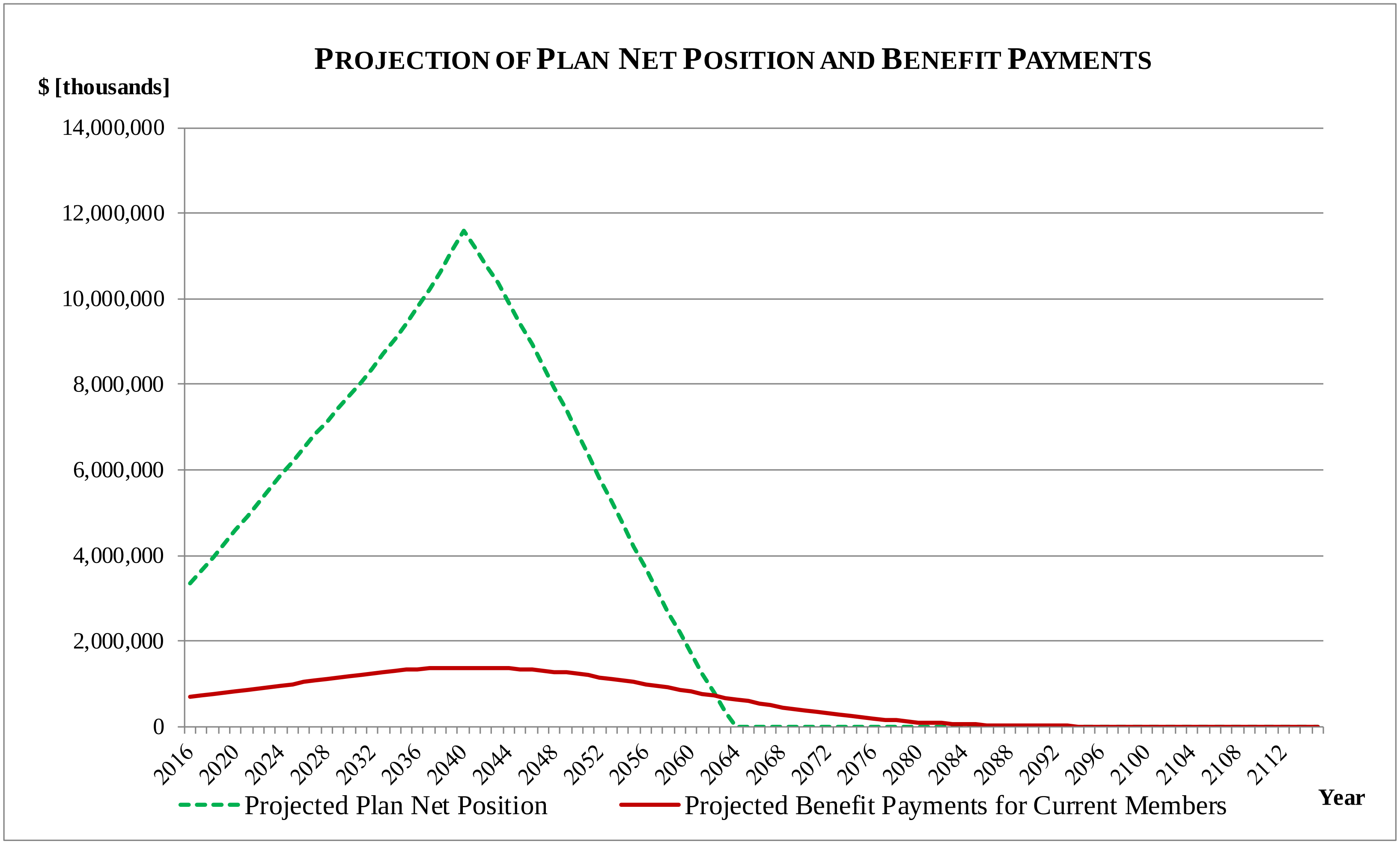
| PYE 12/31 | Open Group Actuarial Liability | Closed Group Actuarial Liability | Future Member Actuarial Liability | Open Group Assets | Future Member Assigned Assets | Closed Group Assigned Assets | Funded Ratio Current Members | Funded Ratio Future Members |
|---|---|---|---|---|---|---|---|---|
| | (a) | (b) | (c)=(a)-(b) | (d) | (e)=min[(c),(d)] | (f)=(d)-(e) | (g)=(f)/(b) | (h)=(e)/(c) |
| 2015 | $11,588,538,028 | $11,588,538,028 | $ - | $3,058,949,037 | $ - | $3,058,949,037 | 26.40% | 0.00% |
| 2016 | 11,963,328,000 | 11,963,060,403 | 267,597 | 3,334,608,439 | 267,597 | 3,334,340,843 | 27.87% | 100.00% |
| 2017 | 12,340,565,263 | 12,333,979,661 | 6,585,602 | 3,648,563,355 | 6,585,602 | 3,641,977,753 | 29.53% | 100.00% |
| 2018 | 12,717,724,554 | 12,698,073,621 | 19,650,934 | 3,974,665,212 | 19,650,934 | 3,955,014,279 | 31.15% | 100.00% |
| 2019 | 13,092,492,085 | 13,051,861,675 | 40,630,410 | 4,311,223,233 | 40,630,410 | 4,270,592,823 | 32.72% | 100.00% |
| 2020 | 13,463,498,180 | 13,392,675,083 | 70,823,097 | 4,658,819,702 | 70,823,097 | 4,587,996,605 | 34.26% | 100.00% |
| 2021 | 13,830,192,902 | 13,718,748,094 | 111,444,808 | 5,018,529,688 | 111,444,808 | 4,907,084,880 | 35.77% | 100.00% |
| 2022 | 14,192,212,060 | 14,028,570,824 | 163,641,237 | 5,391,624,599 | 163,641,237 | 5,227,983,363 | 37.27% | 100.00% |
| 2023 | 14,548,067,268 | 14,319,385,290 | 228,681,978 | 5,778,292,524 | 228,681,978 | 5,549,610,546 | 38.76% | 100.00% |
| 2024 | 14,895,892,387 | 14,587,880,148 | 308,012,239 | 6,178,455,264 | 308,012,239 | 5,870,443,025 | 40.24% | 100.00% |
| 2025 | 15,233,466,476 | 14,830,334,426 | 403,132,050 | 6,591,842,349 | 403,132,050 | 6,188,710,299 | 41.73% | 100.00% |
| 2026 | 15,558,886,238 | 15,042,547,756 | 516,338,482 | 7,019,601,696 | 516,338,482 | 6,503,263,214 | 43.23% | 100.00% |
| 2027 | 15,870,806,353 | 15,221,311,775 | 649,494,578 | 7,463,248,057 | 649,494,578 | 6,813,753,479 | 44.76% | 100.00% |
| 2028 | 16,168,760,138 | 15,364,328,739 | 804,431,399 | 7,924,577,550 | 804,431,399 | 7,120,146,151 | 46.34% | 100.00% |
| 2029 | 16,453,736,855 | 15,470,722,976 | 983,013,879 | 8,408,117,681 | 983,013,879 | 7,425,103,801 | 47.99% | 100.00% |
| 2030 | 16,726,935,529 | 15,539,767,623 | 1,187,167,906 | 8,919,185,389 | 1,187,167,906 | 7,732,017,483 | 49.76% | 100.00% |
| 2031 | 16,989,822,717 | 15,570,682,623 | 1,419,140,093 | 9,464,564,256 | 1,419,140,093 | 8,045,424,163 | 51.67% | 100.00% |
| 2032 | 17,243,604,404 | 15,562,595,787 | 1,681,008,617 | 10,049,091,801 | 1,681,008,617 | 8,368,083,184 | 53.77% | 100.00% |
| 2033 | 17,489,294,292 | 15,514,296,368 | 1,974,997,924 | 10,678,282,617 | 1,974,997,924 | 8,703,284,692 | 56.10% | 100.00% |
| 2034 | 17,728,181,503 | 15,425,726,032 | 2,302,455,471 | 11,356,028,077 | 2,302,455,471 | 9,053,572,605 | 58.69% | 100.00% |
| 2035 | 17,961,858,935 | 15,298,273,775 | 2,663,585,160 | 12,083,766,469 | 2,663,585,160 | 9,420,181,309 | 61.58% | 100.00% |
| 2036 | 18,191,510,685 | 15,133,074,319 | 3,058,436,366 | 12,861,837,389 | 3,058,436,366 | 9,803,401,023 | 64.78% | 100.00% |
| 2037 | 18,419,158,990 | 14,931,306,160 | 3,487,852,831 | 13,695,543,491 | 3,487,852,831 | 10,207,690,660 | 68.36% | 100.00% |
| 2038 | 18,646,496,601 | 14,694,043,037 | 3,952,453,564 | 14,589,888,162 | 3,952,453,564 | 10,637,434,598 | 72.39% | 100.00% |
| 2039 | 18,874,869,708 | 14,422,230,442 | 4,452,639,266 | 15,550,503,499 | 4,452,639,266 | 11,097,864,233 | 76.95% | 100.00% |
| 2040 | 19,105,290,200 | 14,116,941,405 | 4,988,348,795 | 16,583,063,045 | 4,988,348,795 | 11,594,714,250 | 82.13% | 100.00% |
| 2041 | 19,338,944,277 | 13,779,898,114 | 5,559,046,163 | 16,770,357,208 | 5,559,046,163 | 11,211,311,045 | 81.36% | 100.00% |
| 2042 | 19,577,359,750 | 13,413,707,803 | 6,163,651,947 | 16,964,239,660 | 6,163,651,947 | 10,800,587,714 | 80.52% | 100.00% |
| 2043 | 19,821,301,543 | 13,020,712,216 | 6,800,589,327 | 17,165,592,938 | 6,800,589,327 | 10,365,003,611 | 79.60% | 100.00% |
| 2044 | 20,071,513,109 | 12,603,988,866 | 7,467,524,243 | 17,375,023,447 | 7,467,524,243 | 9,907,499,204 | 78.61% | 100.00% |
| 2045 | 20,327,828,760 | 12,166,285,079 | 8,161,543,681 | 17,592,179,704 | 8,161,543,681 | 9,430,636,023 | 77.51% | 100.00% |
| 2046 | 20,590,030,886 | 11,710,935,072 | 8,879,095,814 | 17,816,610,387 | 8,879,095,814 | 8,937,514,573 | 76.32% | 100.00% |
| 2047 | 20,857,494,043 | 11,241,357,324 | 9,616,136,720 | 18,047,296,164 | 9,616,136,720 | 8,431,159,445 | 75.00% | 100.00% |
| 2048 | 21,129,793,008 | 10,760,920,947 | 10,368,872,061 | 18,283,478,343 | 10,368,872,061 | 7,914,606,283 | 73.55% | 100.00% |
| 2049 | 21,406,572,605 | 10,272,839,606 | 11,133,733,000 | 18,524,428,807 | 11,133,733,000 | 7,390,695,807 | 71.94% | 100.00% |
| 2050 | 21,687,071,542 | 9,779,622,850 | 11,907,448,692 | 18,769,092,928 | 11,907,448,692 | 6,861,644,237 | 70.16% | 100.00% |
| 2051 | 21,970,629,527 | 9,283,505,217 | 12,687,124,310 | 19,016,558,517 | 12,687,124,310 | 6,329,434,207 | 68.18% | 100.00% |
| 2052 | 22,256,753,350 | 8,786,586,781 | 13,470,166,569 | 19,266,107,321 | 13,470,166,569 | 5,795,940,753 | 65.96% | 100.00% |
| 2053 | 22,545,262,083 | 8,290,948,634 | 14,254,313,449 | 19,517,334,072 | 14,254,313,449 | 5,263,020,623 | 63.48% | 100.00% |
| 2054 | 22,836,160,951 | 7,798,598,163 | 15,037,562,787 | 19,770,018,922 | 15,037,562,787 | 4,732,456,135 | 60.68% | 100.00% |
| 2055 | 23,129,728,433 | 7,311,426,516 | 15,818,301,917 | 20,024,214,156 | 15,818,301,917 | 4,205,912,239 | 57.53% | 100.00% |
| 2056 | 23,426,624,238 | 6,831,312,735 | 16,595,311,503 | 20,280,412,083 | 16,595,311,503 | 3,685,100,581 | 53.94% | 100.00% |
| 2057 | 23,727,811,915 | 6,360,110,151 | 17,367,701,763 | 20,539,406,405 | 17,367,701,763 | 3,171,704,641 | 49.87% | 100.00% |
| 2058 | 24,034,413,997 | 5,899,621,578 | 18,134,792,418 | 20,802,231,412 | 18,134,792,418 | 2,667,438,993 | 45.21% | 100.00% |
| 2059 | 24,347,734,438 | 5,451,581,740 | 18,896,152,699 | 21,070,099,250 | 18,896,152,699 | 2,173,946,551 | 39.88% | 100.00% |
| 2060 | 24,669,126,619 | 5,017,646,268 | 19,651,480,351 | 21,344,344,846 | 19,651,480,351 | 1,692,864,496 | 33.74% | 100.00% |
| 2061 | 24,999,946,141 | 4,599,357,750 | 20,400,588,392 | 21,626,348,964 | 20,400,588,392 | 1,225,760,572 | 26.65% | 100.00% |
| 2062 | 25,341,496,480 | 4,198,137,095 | 21,143,359,385 | 21,917,497,555 | 21,143,359,385 | 774,138,170 | 18.44% | 100.00% |
| 2063 | 25,694,943,421 | 3,815,217,600 | 21,879,725,822 | 22,219,070,821 | 21,879,725,822 | 339,345,000 | 8.89% | 100.00% |
| 2064 | 26,061,241,938 | 3,451,608,275 | 22,609,633,664 | 22,532,190,529 | 22,532,190,529 | - | 0.00% | 99.66% |

# CURRENT MEMBER PROJECTION OF ASSETS AND ASSIGNMENT OF EMPLOYER CONTRIBUTIONS

| PYE 12/31 | Assets (boy) | Member Contributions | Administrative Expenses | Benefit Payments | Assigned Sponsor Contribution | Income on Assets and Cash Flow | Assets (eoy) |
|---|---|---|---|---|---|---|---|
| 2016 | $ 3,058,949,037 | $ 99,973,324 | $ 4,643,775 | $ 691,683,007 | $ 675,558,158 | $ 196,187,106 | $ 3,334,340,843 |
| 2017 | 3,334,340,843 | 106,685,064 | 4,666,389 | 711,786,624 | 702,794,494 | 214,610,365 | 3,641,977,753 |
| 2018 | 3,641,977,753 | 106,035,588 | 4,651,391 | 743,114,136 | 718,784,852 | 235,981,613 | 3,955,014,279 |
| 2019 | 3,955,014,279 | 104,738,830 | 4,621,391 | 776,077,001 | 733,647,158 | 257,890,948 | 4,270,592,823 |
| 2020 | 4,270,592,823 | 103,077,193 | 4,572,658 | 810,238,914 | 749,182,396 | 279,955,765 | 4,587,996,605 |
| 2021 | 4,587,996,605 | 101,079,951 | 4,508,300 | 844,627,521 | 765,019,761 | 302,124,384 | 4,907,084,880 |
| 2022 | 4,907,084,880 | 98,834,410 | 4,428,724 | 878,945,953 | 781,031,228 | 324,407,522 | 5,227,983,363 |
| 2023 | 5,227,983,363 | 96,314,798 | 4,336,262 | 914,260,267 | 797,132,130 | 346,776,784 | 5,549,610,546 |
| 2024 | 5,549,610,546 | 93,387,886 | 4,227,578 | 950,651,111 | 813,178,348 | 369,144,936 | 5,870,443,025 |
| 2025 | 5,870,443,025 | 90,178,708 | 4,101,972 | 988,493,034 | 829,292,236 | 391,391,336 | 6,188,710,299 |
| 2026 | 6,188,710,299 | 86,435,845 | 3,955,549 | 1,027,507,223 | 846,197,851 | 413,381,992 | 6,503,263,214 |
| 2027 | 6,503,263,214 | 82,278,025 | 3,787,419 | 1,066,605,400 | 863,543,810 | 435,061,248 | 6,813,753,479 |
| 2028 | 6,813,753,479 | 77,688,182 | 3,604,820 | 1,104,748,683 | 880,610,883 | 456,447,110 | 7,120,146,151 |
| 2029 | 7,120,146,151 | 72,935,439 | 3,407,999 | 1,140,925,418 | 898,757,665 | 477,597,962 | 7,425,103,801 |
| 2030 | 7,425,103,801 | 68,312,644 | 3,204,366 | 1,175,384,372 | 918,501,098 | 498,688,678 | 7,732,017,483 |
| 2031 | 7,732,017,483 | 63,578,479 | 2,994,613 | 1,207,739,673 | 940,593,558 | 519,968,929 | 8,045,424,163 |
| 2032 | 8,045,424,163 | 58,855,040 | 2,781,923 | 1,238,329,092 | 963,158,561 | 541,756,434 | 8,368,083,184 |
| 2033 | 8,368,083,184 | 53,899,478 | 2,560,604 | 1,266,936,623 | 986,505,746 | 564,293,511 | 8,703,284,692 |
| 2034 | 8,703,284,692 | 48,926,956 | 2,332,591 | 1,292,768,695 | 1,008,604,213 | 587,858,029 | 9,053,572,605 |
| 2035 | 9,053,572,605 | 44,119,327 | 2,111,584 | 1,314,722,433 | 1,026,596,692 | 612,726,701 | 9,420,181,309 |
| 2036 | 9,420,181,309 | 39,488,127 | 1,908,292 | 1,333,212,989 | 1,039,820,982 | 639,031,886 | 9,803,401,023 |
| 2037 | 9,803,401,023 | 34,957,862 | 1,715,535 | 1,348,122,568 | 1,052,359,952 | 666,809,927 | 10,207,690,660 |
| 2038 | 10,207,690,660 | 30,593,931 | 1,527,203 | 1,359,732,113 | 1,064,100,433 | 696,308,889 | 10,637,434,598 |
| 2039 | 10,637,434,598 | 26,347,472 | 1,339,401 | 1,368,186,820 | 1,075,755,609 | 727,852,776 | 11,097,864,233 |
| 2040 | 11,097,864,233 | 22,371,364 | 1,157,323 | 1,373,710,336 | 1,087,528,902 | 761,817,411 | 11,594,714,250 |
| 2041 | 11,594,714,250 | 18,606,567 | 980,644 | 1,375,624,704 | 175,943,798 | 798,651,778 | 11,211,311,045 |
| 2042 | 11,211,311,045 | 15,273,253 | 820,150 | 1,373,608,729 | 161,019,833 | 787,412,462 | 10,800,587,714 |
| 2043 | 10,800,587,714 | 12,265,926 | 670,602 | 1,367,907,339 | 163,727,534 | 757,000,378 | 10,365,003,611 |
| 2044 | 10,365,003,611 | 9,670,350 | 537,905 | 1,358,099,126 | 166,912,388 | 724,549,886 | 9,907,499,204 |
| 2045 | 9,907,499,204 | 7,445,578 | 421,160 | 1,344,627,463 | 170,145,722 | 690,594,143 | 9,430,636,023 |
| 2046 | 9,430,636,023 | 5,563,738 | 319,945 | 1,327,037,210 | 173,322,697 | 655,349,269 | 8,937,514,573 |
| 2047 | 8,937,514,573 | 4,087,801 | 238,801 | 1,305,597,072 | 176,350,865 | 619,042,078 | 8,431,159,445 |
| 2048 | 8,431,159,445 | 2,909,839 | 172,629 | 1,280,385,190 | 179,200,287 | 581,894,531 | 7,914,606,283 |
| 2049 | 7,914,606,283 | 2,051,195 | 123,453 | 1,251,806,116 | 181,847,204 | 544,120,694 | 7,390,695,807 |
| 2050 | 7,390,695,807 | 1,411,792 | 86,160 | 1,220,593,807 | 184,313,049 | 505,903,555 | 6,861,644,237 |
| 2051 | 6,861,644,237 | 933,231 | 57,748 | 1,187,084,943 | 186,604,949 | 467,394,482 | 6,329,434,207 |
| 2052 | 6,329,434,207 | 589,763 | 37,001 | 1,151,526,714 | 188,748,468 | 428,732,029 | 5,795,940,753 |
| 2053 | 5,795,940,753 | 349,234 | 22,213 | 1,114,039,521 | 190,741,594 | 390,050,776 | 5,263,020,623 |
| 2054 | 5,263,020,623 | 197,308 | 12,723 | 1,074,828,597 | 192,597,566 | 351,481,958 | 4,732,456,135 |
| 2055 | 4,732,456,135 | 100,709 | 6,589 | 1,034,104,444 | 194,316,338 | 313,150,089 | 4,205,912,239 |
| 2056 | 4,205,912,239 | 43,723 | 2,903 | 991,991,726 | 195,964,343 | 275,174,905 | 3,685,100,581 |
| 2057 | 3,685,100,581 | 17,648 | 1,189 | 948,638,593 | 197,548,452 | 237,677,743 | 3,171,704,641 |
| 2058 | 3,171,704,641 | 5,086 | 348 | 904,206,910 | 199,158,353 | 200,778,170 | 2,667,438,993 |
| 2059 | 2,667,438,993 | 2,215 | 154 | 858,887,445 | 200,797,047 | 164,595,895 | 2,173,946,551 |
| 2060 | 2,173,946,551 | 1,553 | 109 | 812,873,809 | 202,543,617 | 129,246,692 | 1,692,864,496 |
| 2061 | 1,692,864,496 | 1,089 | 78 | 766,392,803 | 204,444,461 | 94,843,407 | 1,225,760,572 |
| 2062 | 1,225,760,572 | - | - | 719,672,651 | 206,555,954 | 61,494,295 | 774,138,170 |
| 2063 | 774,138,170 | - | - | 672,998,579 | 208,904,828 | 29,300,580 | 339,345,000 |
| 2064 | 339,345,000 | - | - | 626,675,169 | 288,978,597 | (1,648,427) | - |

# DEVELOPMENT OF SINGLE DISCOUNT RATE

| PYE 12/31 | Benefit Payments | Discount Rate | Discounted Benefit Payment | Single Discount Rate | Discounted Benefit Payment |
|---|---|---|---|---|---|
| 2016 | $ 691,683,007 | 7.50% | $ 667,118,331 | 7.15% | $ 668,205,274 |
| 2017 | 711,786,624 | 7.50% | 638,612,075 | 7.15% | 641,738,656 |
| 2018 | 743,114,136 | 7.50% | 620,203,713 | 7.15% | 625,272,728 |
| 2019 | 776,077,001 | 7.50% | 602,525,162 | 7.15% | 609,430,749 |
| 2020 | 810,238,914 | 7.50% | 585,160,508 | 7.15% | 593,797,319 |
| 2021 | 844,627,521 | 7.50% | 567,438,338 | 7.15% | 577,691,461 |
| 2022 | 878,945,953 | 7.50% | 549,296,907 | 7.15% | 561,046,008 |
| 2023 | 914,260,267 | 7.50% | 531,503,788 | 7.15% | 544,642,763 |
| 2024 | 950,651,111 | 7.50% | 514,101,906 | 7.15% | 528,528,775 |
| 2025 | 988,493,034 | 7.50% | 497,271,080 | 7.15% | 512,892,886 |
| 2026 | 1,027,507,223 | 7.50% | 480,834,929 | 7.15% | 497,557,791 |
| 2027 | 1,066,605,400 | 7.50% | 464,308,291 | 7.15% | 482,023,277 |
| 2028 | 1,104,748,683 | 7.50% | 447,360,556 | 7.15% | 465,943,557 |
| 2029 | 1,140,925,418 | 7.50% | 429,776,820 | 7.15% | 449,089,250 |
| 2030 | 1,175,384,372 | 7.50% | 411,867,175 | 7.15% | 431,778,389 |
| 2031 | 1,207,739,673 | 7.50% | 393,678,898 | 7.15% | 414,056,787 |
| 2032 | 1,238,329,092 | 7.50% | 375,488,306 | 7.15% | 396,212,558 |
| 2033 | 1,266,936,623 | 7.50% | 357,360,680 | 7.15% | 378,314,194 |
| 2034 | 1,292,768,695 | 7.50% | 339,206,556 | 7.15% | 360,266,730 |
| 2035 | 1,314,722,433 | 7.50% | 320,899,485 | 7.15% | 341,934,554 |
| 2036 | 1,333,212,989 | 7.50% | 302,709,478 | 7.15% | 323,604,117 |
| 2037 | 1,348,122,568 | 7.50% | 284,739,290 | 7.15% | 305,386,242 |
| 2038 | 1,359,732,113 | 7.50% | 267,154,755 | 7.15% | 287,461,063 |
| 2039 | 1,368,186,820 | 7.50% | 250,061,305 | 7.15% | 269,945,854 |
| 2040 | 1,373,710,336 | 7.50% | 233,554,259 | 7.15% | 252,948,443 |
| 2041 | 1,375,624,704 | 7.50% | 217,562,544 | 7.15% | 236,397,237 |
| 2042 | 1,373,608,729 | 7.50% | 202,087,169 | 7.15% | 220,298,255 |
| 2043 | 1,367,907,339 | 7.50% | 187,207,788 | 7.15% | 204,743,574 |
| 2044 | 1,358,099,126 | 7.50% | 172,898,107 | 7.15% | 189,710,189 |
| 2045 | 1,344,627,463 | 7.50% | 159,240,041 | 7.15% | 175,293,878 |
| 2046 | 1,327,037,210 | 7.50% | 146,192,449 | 7.15% | 161,455,728 |
| 2047 | 1,305,597,072 | 7.50% | 133,795,819 | 7.15% | 148,246,726 |
| 2048 | 1,280,385,190 | 7.50% | 122,057,805 | 7.15% | 135,681,979 |
| 2049 | 1,251,806,116 | 7.50% | 111,007,805 | 7.15% | 123,801,009 |
| 2050 | 1,220,593,807 | 7.50% | 100,688,332 | 7.15% | 112,658,473 |
| 2051 | 1,187,084,943 | 7.50% | 91,092,226 | 7.15% | 102,253,947 |
| 2052 | 1,151,526,714 | 7.50% | 82,198,723 | 7.15% | 92,571,625 |
| 2053 | 1,114,039,521 | 7.50% | 73,974,696 | 7.15% | 83,581,479 |
| 2054 | 1,074,828,597 | 7.50% | 66,391,631 | 7.15% | 75,258,274 |
| 2055 | 1,034,104,444 | 7.50% | 59,419,647 | 7.15% | 67,574,841 |
| 2056 | 991,991,726 | 7.50% | 53,023,116 | 7.15% | 60,497,059 |
| 2057 | 948,638,593 | 7.50% | 47,168,224 | 7.15% | 53,992,394 |
| 2058 | 904,206,910 | 7.50% | 41,822,317 | 7.15% | 48,029,184 |
| 2059 | 858,887,445 | 7.50% | 36,954,562 | 7.15% | 42,577,408 |
| 2060 | 812,873,809 | 7.50% | 32,534,675 | 7.15% | 37,607,259 |
| 2061 | 766,392,803 | 7.50% | 28,534,239 | 7.15% | 33,090,670 |
| 2062 | 719,672,651 | 7.50% | 24,925,358 | 7.15% | 28,999,781 |
| 2063 | 672,998,579 | 7.50% | 21,682,637 | 7.15% | 25,309,261 |
| 2064 | 626,675,169 | 7.50% | 18,781,573 | 7.15% | 21,994,464 |
| 2065 | 581,011,392 | 3.57% | 102,353,530 | 7.15% | 19,030,979 |
| 2066 | 536,297,339 | 3.57% | 91,219,952 | 7.15% | 16,394,105 |
| 2067 | 492,768,571 | 3.57% | 80,926,959 | 7.15% | 14,058,230 |
| 2068 | 450,627,300 | 3.57% | 71,455,185 | 7.15% | 11,998,052 |
| 2069 | 410,053,707 | 3.57% | 62,780,246 | 7.15% | 10,189,188 |
| 2070 | 371,205,685 | 3.57% | 54,873,532 | 7.15% | 8,608,332 |
| 2071 | 334,212,418 | 3.57% | 47,702,034 | 7.15% | 7,233,235 |
| 2081 | 80,851,896 | 3.57% | 8,125,774 | 7.15% | 877,114 |
| 2091 | 7,516,409 | 3.57% | 531,919 | 7.15% | 40,873 |
| 2101 | 152,098 | 3.57% | 7,579 | 7.15% | 415 |
| 2111 | 400 | 3.57% | 14 | 7.15% | 1 |
| 2112 | 196 | 3.57% | 7 | 7.15% | 0 |
| 2113 | 93 | 3.57% | 3 | 7.15% | 0 |
| 2114 | 42 | 3.57% | 1 | 7.15% | 0 |
| **Total Present Value** | | | **$ 14,120,362,153** | | **$ 14,120,362,153** |



PROJECTION OF PLAN NET POSITION AND BENEFIT PAYMENTS
$ [thousands]
14,000,000
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
2016
2020
2024
2028
2032
2036
2040
2044
2048
2052
2056
2060
2064
2068
2072
2076
2080
2084
2088
2092
2096
2100
2104
2108
2112
Year
Projected Plan Net Position
Projected Benefit Payments for Current Members

# SECTION H

## GLOSSARY OF TERMS

## GLOSSARY OF TERMS

| | |
|---|---|
| ***Accrued Service*** | Service credited under the system which was rendered before the date of the actuarial valuation. |
| ***Actuarial Accrued Liability ("AAL")*** | The AAL is the difference between the actuarial present value of all benefits and the actuarial value of future normal costs. The definition comes from the fundamental equation of funding which states that the present value of all benefits is the sum of the Actuarial Accrued Liability and the present value of future normal costs. The AAL may also be referred to as "accrued liability" or "actuarial liability." |
| ***Actuarial Assumptions*** | These assumptions are estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and compensation increases. Actuarial assumptions are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (compensation increases, payroll growth, inflation and investment return) consist of an underlying real rate of return plus an assumption for a long-term average rate of inflation. |
| ***Actuarial Cost Method*** | A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of the pension trust benefits between future normal cost and actuarial accrued liability. The actuarial cost method may also be referred to as the actuarial funding method. |
| ***Actuarial Equivalent*** | A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate actuarial assumptions. |
| ***Actuarial Gain (Loss)*** | The difference in liabilities between actual experience and expected experience during the period between two actuarial valuations is the gain (loss) on the accrued liabilities. |
| ***Actuarial Present Value ("APV")*** | The amount of funds currently required to provide a payment or series of payments in the future. The present value is determined by discounting future payments at predetermined rates of interest and probabilities of payment. |
| ***Actuarial Valuation*** | The actuarial valuation report determines, as of the actuarial valuation date, the service cost, total pension liability and related actuarial present value of projected benefit payments for pensions. |
| ***Actuarial Valuation Date*** | The date as of which an actuarial valuation is performed. |
| ***Actuarially Determined Contribution ("ADC") or Annual Required Contribution ("ARC")*** | A calculated contribution into a defined benefit pension plan for the reporting period, most often determined based on the funding policy of the plan. Typically the Actuarially Determined Contribution has a normal cost payment and an amortization payment. |

# GLOSSARY OF TERMS

***Amortization Method*** The method used to determine the periodic amortization payment may be a level dollar amount, or a level percent of pay amount. The period will typically be expressed in years, and the method will either be "open" (meaning, reset each year) or "closed" (the number of years remaining will decline each year.

***Amortization Payment*** The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.

***Cost-of-Living Adjustments*** Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.

***Cost-Sharing Multiple-Employer Defined Benefit Pension Plan (cost-sharing pension plan)*** A multiple-employer defined benefit pension plan in which the pension obligations to the employees of more than one employer are pooled and pension plan assets can be used to pay the benefits of the employees of any employer that provides pensions through the pension plan.

***Covered-Employee Payroll*** The payroll of employees that are provided with pensions through the pension plan.

***Deferred Inflows and Outflows*** The deferred inflows and outflows of pension resources are amounts used under GASB Statement No. 68 in developing the annual pension expense. Deferred inflows and outflows arise with differences between expected and actual experiences; changes of assumptions. The portion of these amounts not included in pension expense should be included in the deferred inflows or outflows of resources.

***Deferred Retirement Option Program ("DROP")*** A program that permits a plan member to elect a calculation of benefit payments based on service credits and salary, as applicable, as of the DROP entry date. The plan member continues to provide service to the employer and is paid for the service by the employer after the DROP entry date; however, the pensions that would have been paid to the plan member are credited to an individual member account within the defined benefit pension plan until the end of the DROP period. Other variations for DROP exist and will be more fully detailed in the plan provision section of the valuation report.

***Discount Rate*** For GASB purposes, the discount rate is the single rate of return that results in the present value of all projected benefit payments to be equal to the sum of the funded and unfunded projected benefit payments, specifically:

1. The benefit payments to be made while the pension plans' fiduciary net position is projected to be greater than the benefit payments that are projected to be made in the period; and
2. The present value of the benefit payments not in (1) above, discounted using the municipal bond rate.

# GLOSSARY OF TERMS

***Entry Age Actuarial Cost Method ("EAN")*** The EAN is a cost method for allocating the costs of the plan between the normal cost and the accrued liability. The actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis (either level dollar or level percent of pay) over the earnings or service of the individual between entry age and assumed exit ages(s). The portion of the actuarial present value allocated to a valuation year is the normal cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is the actuarial accrued liability. The sum of the accrued liability plus the present value of all future normal costs is the present value of all benefits.

***Fiduciary Net Position*** The fiduciary net position is the market value of the assets of the trust dedicated to the defined benefit provisions.

***GASB*** The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities.

***Long-Term Expected Rate of Return*** The long-term rate of return is the expected return to be earned over the entire trust portfolio based on the asset allocation of the portfolio.

***Money-Weighted Rate of Return*** The money-weighted rate of return is a method of calculating the returns that adjusts for the changing amounts actually invested. For purposes of GASB Statement No. 67, money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.

***Multiple-Employer Defined Benefit Pension Plan*** A multiple-employer plan is a defined benefit pension plan that is used to provide pensions to the employees of more than one employer.

***Municipal Bond Rate*** The Municipal Bond Rate is the discount rate to be used for those benefit payments that occur after the assets of the trust have been depleted.

***Net Pension Liability ("NPL")*** The NPL is the liability of employers and non-employer contributing entities to plan members for benefits provided through a defined benefit pension plan.

***Non-Employer Contributing Entities*** Non-employer contributing entities are entities that make contributions to a pension plan that is used to provide pensions to the employees of other entities. For purposes of the GASB accounting statements, plan members are not considered non-employer contributing entities.

***Normal Cost*** The portion of the actuarial present value allocated to a valuation year is called the normal cost. For purposes of application to the requirements of this Statement, the term normal cost is the equivalent of service cost.

## GLOSSARY OF TERMS

***Other Postemployment Benefits ("OPEB")*** All postemployment benefits other than retirement income (such as death benefits, life insurance, disability and long-term care) that are provided separately from a pension plan, as well as postemployment healthcare benefits regardless of the manner in which they are provided. Other post-employment benefits do not include termination benefits.

***Real Rate of Return*** The real rate of return is the rate of return on an investment after adjustment to eliminate inflation.

***Service Cost*** The service cost is the portion of the actuarial present value of projected benefit payments that is attributed to a valuation year.

***Total Pension Expense*** The total pension expense is the sum of the following items that are recognized at the end of the employer's fiscal year:

1. Service Cost
2. Interest on the Total Pension Liability
3. Current-Period Benefit Changes
4. Employee Contributions (made negative for addition here)
5. Projected Earnings on Plan Investments (made negative for addition here)
6. Pension Plan Administrative Expense
7. Other Changes in Plan Fiduciary Net Position
8. Recognition of Outflow (Inflow) of Resources due to Liabilities
9. Recognition of Outflow (Inflow) of Resources due to Assets

***Total Pension Liability ("TPL")*** The TPL is the portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service.

***Unfunded Actuarial Accrued Liability ("UAAL")*** The UAAL is the difference between actuarial accrued liability and valuation assets.

***Valuation Assets*** The valuation assets are the assets used in determining the unfunded liability of the plan. For purposes of GASB Statement Nos. 67 and 68, the valuation assets are equal to the market value of assets.