Gabriel Roeder Smith & Company
Consultants & Actuaries

# THE POLICE AND FIRE RETIREMENT SYSTEM OF THE CITY OF DETROIT

ANNUAL ACTUARIAL VALUATION OF COMPONENT II

JUNE 30, 2016

GRS
Gabriel Roeder Smith & Company
Consultants & Actuaries
One Towne Square
Suite 800
Southfield, MI 48076-3723
248.799.9000 phone
248.799.9020 fax
www.gabrielroeder.com

May 31, 2017

Board of Trustees
The Police and Fire Retirement System of the City of Detroit

Dear Board Members:

This report provides key results of the **Annual Actuarial Valuation** of the annuity and pension liabilities of the Police and Fire Retirement System of the City of Detroit – Component II benefits. The date of the valuation was **June 30, 2016.**

The City of Detroit filed for bankruptcy on July 18, 2013. A final Plan of Adjustment ("POA") was confirmed on November 7, 2014 and the official exit from bankruptcy was on December 10, 2014. In connection with the POA, very significant changes were made to the benefits that the Police and Fire Retirement System provide and to the contributions that it will receive. In particular, the benefits provided by the Retirement System were divided into two separate plans, referred to as "Component I" and "Component II." The benefits provided in each component are effective July 1, 2014 and are described in detail in the Emergency Manager Order No. 44, dated December 8, 2014. In very general terms, Component I provides benefits for service rendered on and after July 1, 2014 and Component II provides benefits for service rendered prior to July 1, 2014.

The results provided herein relate solely to the **Component II** benefits. Component I benefits will be the subject of a separate report. The purposes of the valuation are to measure the funding progress of Component II in accordance with the terms of the POA and to provide alternate illustrative actuarially determined contribution amounts for comparison with the contribution amounts provided in the POA. The results of the valuation are not applicable for other purposes. In particular, the information provided in this report is not suitable for financial reporting in connection with GASB Statement No. 67. Such information was provided in a separate report. Information regarding potential benefit restoration as allowed for in the POA will also be provided in a separate report at the Board's request.

The contribution amounts on page 4 include POA stipulated contributions plus two illustrative contribution amounts from alternate funding policies. Users of this report should be aware that contributions made at any of these amounts do not guarantee benefit security.

This report was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as: plan experience differing from that anticipated by the economic and demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of the actuary's assignment, the actuary did not perform an analysis of the potential range of such future measurements.

The valuation was based upon records maintained and furnished by the Retirement System staff concerning active members, retirees and beneficiaries, and financial accounts as of the valuation date. Data was checked for year-to-year consistency, but was not audited by the actuary. We are not responsible for the completeness or accuracy of the data. Certain data was not available in time to produce the results in this report and it was necessary for us to use approximations. Please see related discussion in the Comments section of this report.

The data supplied by the Retirement System was contained in one file this year. However, reported pays and Average Final Compensation amounts were determined under Component II rules without regard to the freeze date. In addition, reported service was total service (Component I benefit service plus Component II benefit service). We therefore collected additional Component I pays and performed several manual adjustments (after confirming with System staff) to create data that could be used for this valuation. More details (as they relate to Component II) are provided in the data section of this report.

The assumptions used in the valuations concerning future experience are summarized in the Appendix of this report. Except for the assumed rate of investment return, the actuarial assumptions used for the valuation are set by the Board based upon discussion with the actuary and other parties. The assumed rate of investment return was set to 6.75% in the POA and is therefore a "prescribed assumption set by another party" as discussed in Actuarial Standard of Practice No. 4. In our judgement, all of the actuarial assumptions used for the valuation are reasonable for purposes of the measurement being taken.

This report has been prepared by individuals who have substantial experience valuing public sector retirement systems. To the best of our knowledge, this report is complete and accurate and was made in accordance with standards of practice promulgated by the Actuarial Standards Board.

The individuals signing the report are independent of the plan sponsor.

David T. Kausch and Judith A. Kermans are Members of the American Academy of Actuaries (MAAA), and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

This report does not evaluate the plan sponsor's ability or willingness to make contributions to the Retirement System. Given the funded level of Component II, plan sponsor contributions are critical if further benefit reductions are to be avoided. Indeed, the employer contributions set forth in the POA are expected to lead to a decrease in the funded status through June 30, 2023 (as contemplated by the POA), even if all assumptions are met.

Respectfully submitted,

David T Kausch

David T. Kausch, FSA, EA, FCA, MAAA

Judith A. Kermans

Judith A. Kermans, EA, FCA, MAAA

Kenneth G. Alberts

Kenneth G. Alberts

DTK/JAK/KGA:bd

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# VALUATION RESULTS

## Actual POA Contributions

The expected contributions for fiscal year 2017 through 2023 are provided in the POA. The DIA entered into an agreement to pay part of its contribution requirement in a single lump sum payment in fiscal year 2016. A contribution schedule showing the remaining POA mandated contributions through 2023 follows:

| | Contribution Source (Millions) | |
|---|---|---|
| **Fiscal Year** | **Foundations** | **Total** |
| 2017 | $ 18.3 | $ 18.3 |
| 2018 | 18.3 | 18.3 |
| 2019 | 18.3 | 18.3 |
| 2020 | 18.3 | 18.3 |
| 2021 | 18.3 | 18.3 |
| 2022 | 18.3 | 18.3 |
| 2023 | 18.3 | 18.3 |

We have assumed that the contributions outlined above (as called for in the POA with adjustments) will not change. An estimate of the probability of those payments being made was outside the scope of this project, not required by Actuarial Standards, and was not made.

## Estimated 2024 Contributions

In order to help the Board access the longer term implications of the funding policy dictated in the POA, we have estimated the contribution that will be needed in 2024 when actuarially determined contributions will again be required according to the Plan.

The Estimated Employer Contribution for FY 2024 shown below is based on a projection of results assuming only the POA contributions are made and all future experience between the valuation date and FY 2024 is as assumed. Actual experience will impact the final result (which will be based on the June 30, 2023 actuarial valuation) and could be materially different than shown.

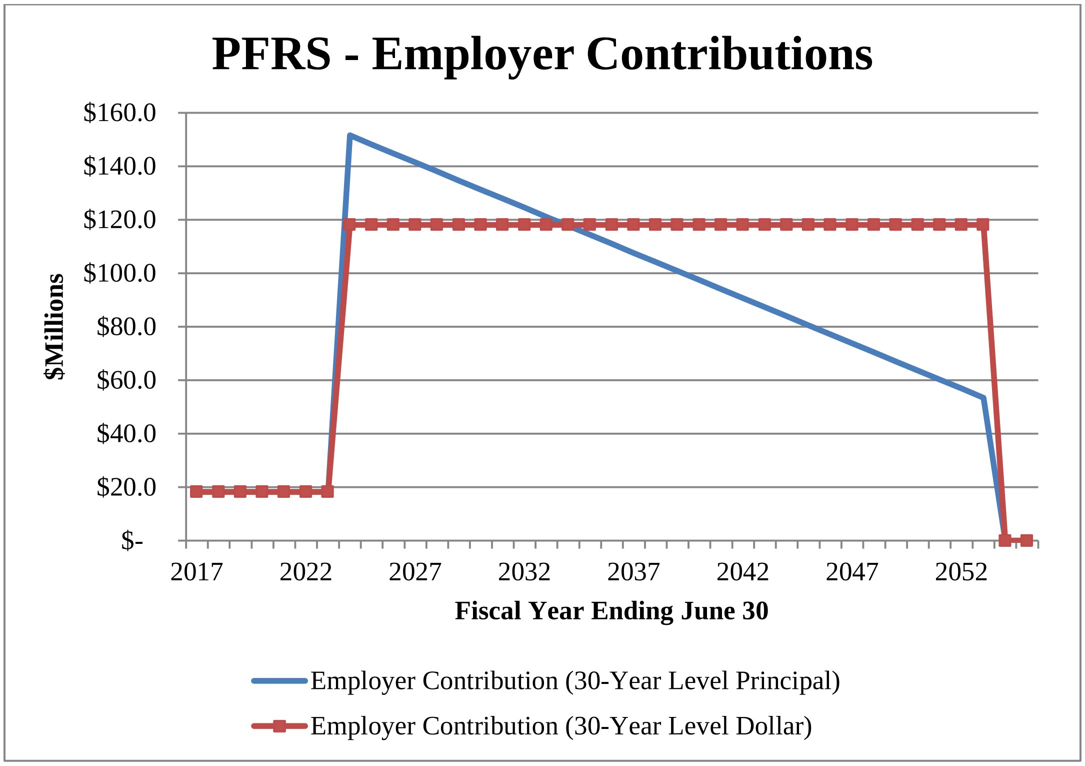
| | **($ millions)** |
|---|---|
| UAAL * as of June 30, 2016 | $ 1,051.3 |
| Anticipated POA Contribution for FY 2017 | 18.3 |
| Anticipated Expenses@ | - |
| Interest at 6.75% | 71.0 |
| Projected UAAL * as of June 30, 2017 | $ 1,103.9 |
| **Anticipated POA Contributions for FY 2018** | **18.3** |
| **Estimated Employer Contributions for FY 2024 !** | |
| **Level Principal (30-year period beginning in FY 2024)** | **$ 151.6** |
| **Level Dollar (30-year period beginning in FY 2024)** | **$ 118.1** |

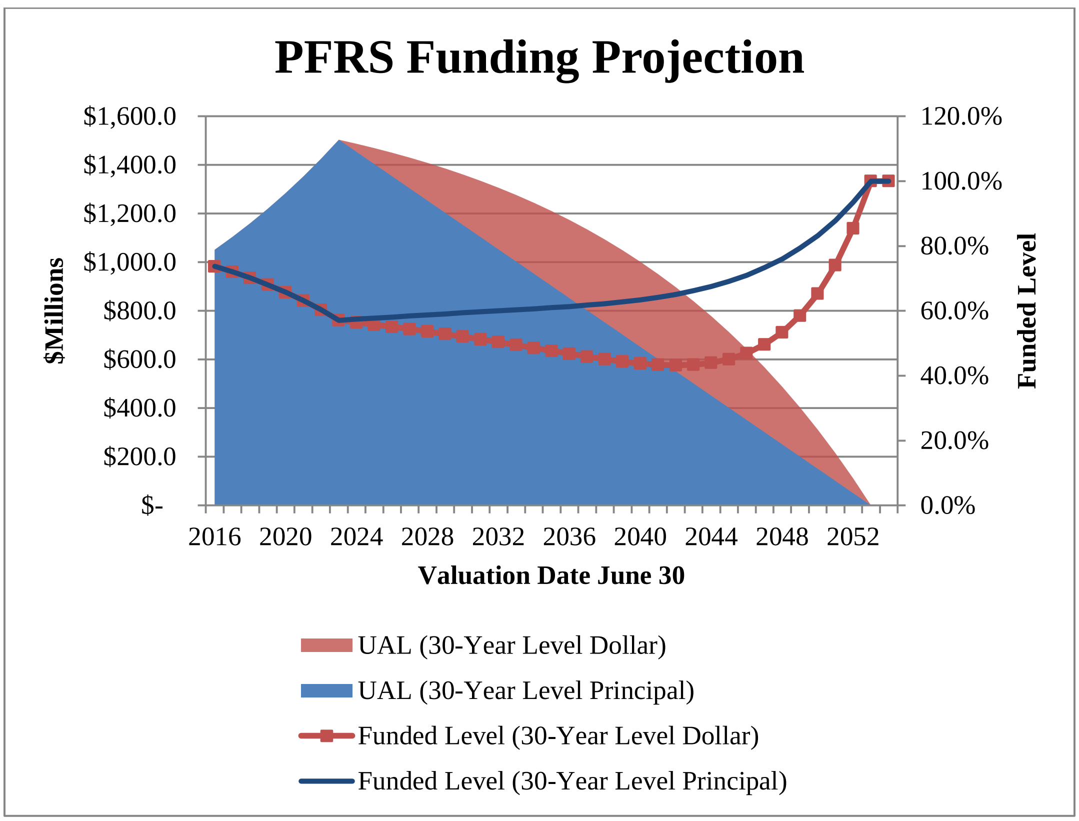
* *Unfunded Actuarial Accrued Liability.*

@ *In accordance with the Plan Document, the mandated 6.75% rate of return is net of investment and administrative expenses. Contributions are assumed to be made at the end of the year.*

! *Total estimated employer contributions needed, including amounts paid by employer but funded from other sources as required by the POA.*

**The POA contributions result in a defunding of the plan between now and June 30, 2023, which was contemplated by the POA. In fact, the anticipated POA contribution for FY 2017 is about a fourth of the interest that will accrue on the UAAL**.




Notes: 30-year amortization periods are assumed to begin in FY 2024.
30-year level dollar is expected to result in a declining funded status long after June 30, 2023.

At the request of the Board, in addition to the status valuation calculations on page 3, we illustrate two alternatives of what the funding requirements would be if the FY 2018 contributions were determined by actuarial funding.

In the chart below, the first policy funds the UAAL over the expected remaining active service life of this group. The second policy is similar to the Board's pre-bankruptcy policy, but with accelerated principle payments of the UAAL to prevent insolvency prior to the end of the funding period. The illustrations are intended to show that there are a broad range of possible funding policies, but are not intended to provide specific recommendation or a minimum or maximum level of contributions.

***Funding Policy 1*** is based on amortizing the UAAL over the average remaining service life of active members (6 years) using level dollar amortization.

***Funding Policy 2*** is based on amortizing the UAAL with level principal payments over a 30-year period plus interest. This method is also known as level principal declining interest amortization.

| Illustrative Contribution Shortfall | ($ millions) |
|---|---|
| (1) Illustrative Contribution for FY 2018 (Funding Policy 1) | $ 229.8 |
| (2) Illustrative Contribution for FY 2018 (Funding Policy 2) | 111.3 |
| (3) POA Contribution for FY 2018 | 18.3 |
| Fiscal Year 2018 Shortfall - Funding Policy 1: (1) - (3) | $ 211.5 |
| Fiscal Year 2018 Shortfall - Funding Policy 2: (2) - (3) | $ 93.0 |

**Recommendation: As shown above, even illustrative funding policy two, which uses the maximum amortization period allowed under current Michigan law, results in a shortfall. We recommend that additional contributions be made to the Component II Plan. Increasing contributions potentially increases the benefit security of the plan members**.

**We understand the Employer has set aside some money to contribute to the Pension Plans in the future. Since the portion of the fund this Plan will receive has not been determined, we have not taken those assets into account in our calculations.**

| Present Value | June 30, 2016 | June 30, 2015 |
|---|---|---|
| **Accrued Pension Liabilities** | | |
| Retirees and beneficiaries | $3,087,133,661 | $3,096,558,677 |
| Inactive members future deferred pensions | 53,470,314 | 43,256,874 |
| Active members | 705,781,125 | 747,941,700 |
| Total accrued pension liabilities | 3,846,385,100 | 3,887,757,251 |
| Pension fund balances | 2,795,133,593 | 3,029,159,749 |
| Unfunded accrued pension liabilities | $1,051,251,507 | $ 858,597,502 |
| **Accrued Annuity Liabilities** | | |
| Retirees and beneficiaries | | |
| Future annuities | $ 3,998,271 | $ 4,161,009 |
| Reserve for outstanding refunds & contingencies | 26,668,368 | 46,800,981 |
| Reserve for Transfer to Component I # | 20,000,000 | 0 |
| Total | $ 50,666,639 | $ 50,961,990 |
| Members annuities & future refunds | 104,670,218 | 114,632,702 |
| Total accrued annuity liabilities | 155,336,857 | 165,594,692 |
| Annuity fund balances | 155,336,857 | 165,594,692 |
| Unfunded accrued annuity liabilities | $ 0 | $ 0 |
| **System Totals** | | |
| Actuarial accrued liabilities | $4,001,721,957 | $4,053,351,943 |
| Accrued assets | 2,950,470,450 | 3,194,754,441 |
| Unfunded actuarial accrued liabilities# | $ 1,051,251,507 | $ 858,597,502 |

*# The Board has passed a motion to transfer $20 million from the Annuity Reserve Fund of Component II to the Pension Accumulation Fund of Component I to fund transition costs, in accordance with the Plan.*

### FUNDED RATIO - POA

| | | Defined Benefit | Annuity Funds[1] | Total |
|---|---|---|---|---|
| A | Actuarial Accrued Liability | $ 3,846,385,100 | $ 155,336,857 | $ 4,001,721,957 |
| B | Market Value of Assets | $ 2,795,133,593 | $ 155,336,857 | $ 2,950,470,450 |
| C | Unfunded Actuarial Accrued Liability (A - B) | $ 1,051,251,507 | $ - | $ 1,051,251,507 |
| D | Funded Ratio (B/A) | 72.7% | 100.0% | 73.7% |

**The POA Funded Ratio** is an expected return based measurement of the pension obligations. It is based upon the POA mandated 6.75% interest rate assumption (assumption prescribed by another party). It determines an amount that will be sufficient to provide benefits if the portfolio earns the expected 6.75% return on assets and all other assumptions are met. This measure is appropriate for assessing the need for or amount of future contributions if all assumptions are met. This measure is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligation, in other words, of transferring the obligation to a third party in a market value type transaction.

### FUNDED RATIO - SOLVENCY

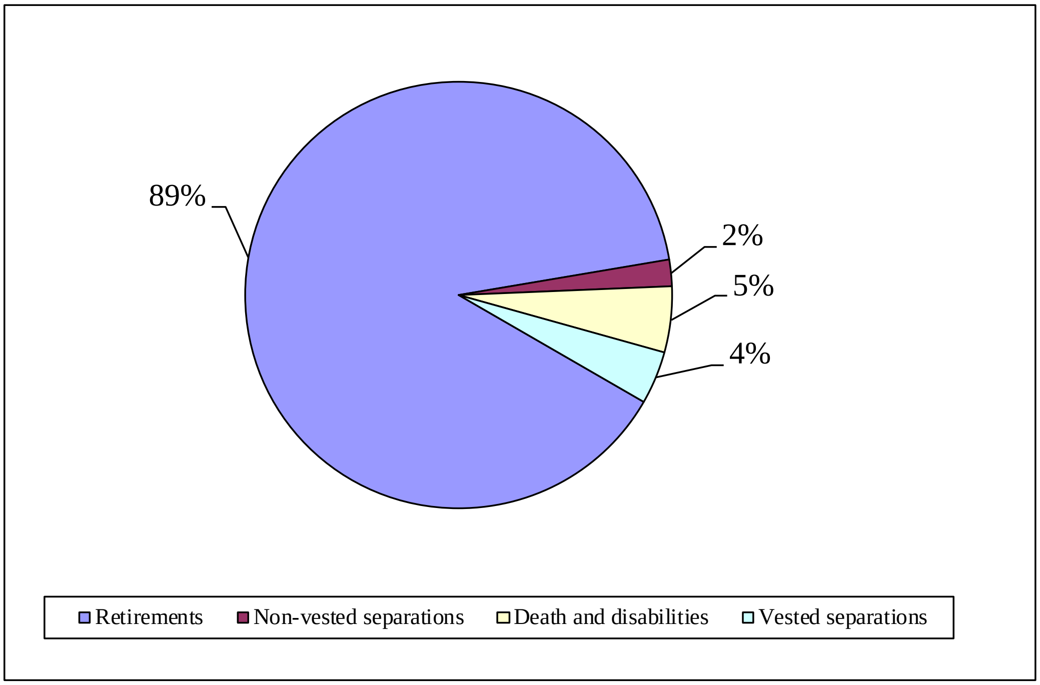
| | | Defined Benefit | Annuity Funds[1] | Total |
|---|---|---|---|---|
| A | Actuarial Accrued Liability | $ 6,177,508,311 | $ 155,336,857 | $ 6,332,845,168 |
| B | Market Value of Assets | $ 2,795,133,593 | $ 155,336,857 | $ 2,950,470,450 |
| C | Unfunded Actuarial Accrued Liability (A - B) | $ 3,382,374,718 | $ - | $ 3,382,374,718 |
| D | Funded Ratio (B/A) | 45.2% | 100.0% | 46.6% |

[1] *Prior to adjustment for $20 million transfer.*

**The Solvency Liability** is a market-based measurement of the pension obligations. It represents the amount the plan would need to invest in low risk securities to provide the benefits with greater certainty. For this purpose, the solvency liability is computed at 2.85% as of June 30, 2016, based on the long-term municipal bond rate ("State & local bonds" rate from Federal Reserve statistical release (H.15) as of June 30, 2016). No adjustment has been made for the credit quality of the plan sponsor. This measure may not be appropriate for assessing the need for or amount of future contributions. This measure may not be appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligation.

**The difference between the two measures (POA and Solvency) is one illustration of the savings the sponsor anticipates by taking on the risk in a diversified portfolio.**

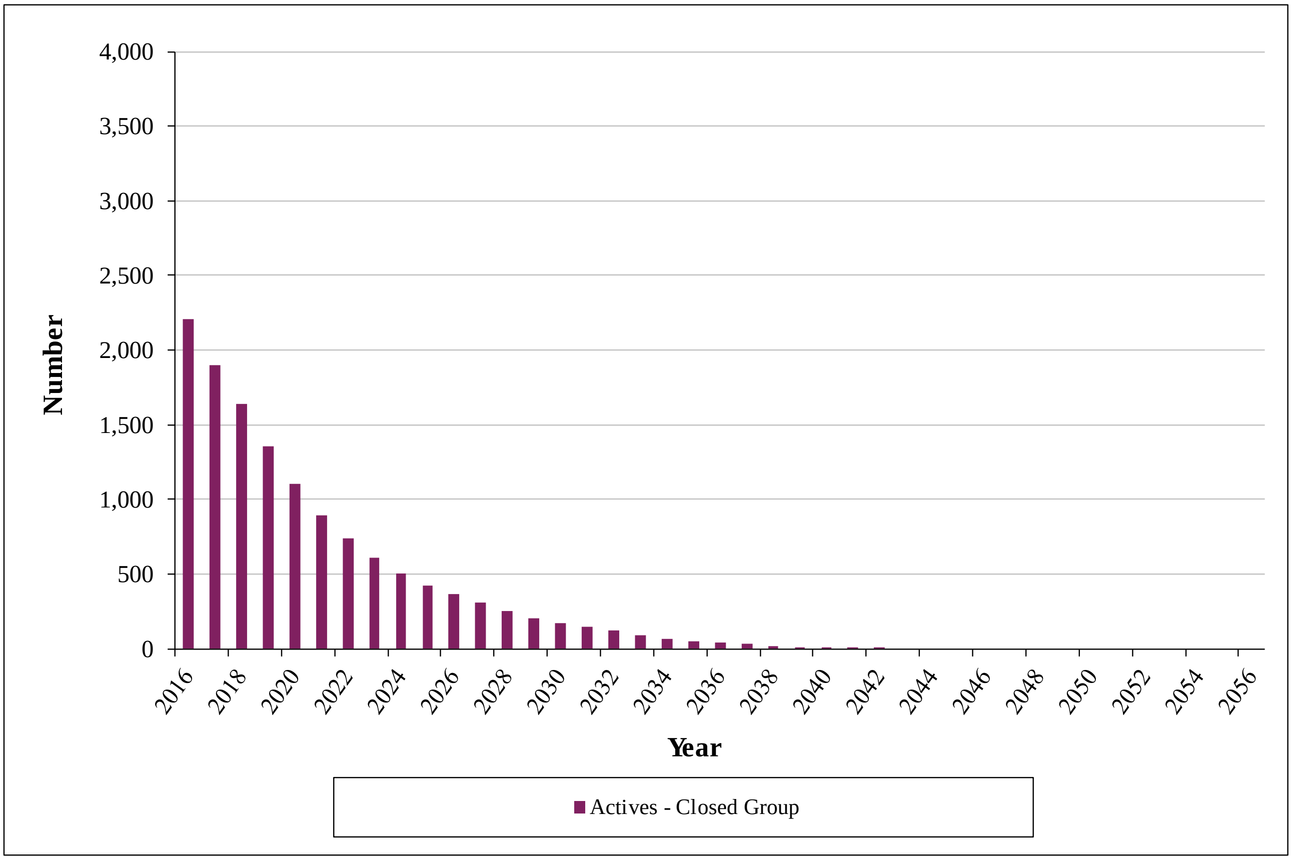
# EXPECTED TERMINATIONS FROM ACTIVE EMPLOYMENT FOR CURRENT ACTIVE MEMBERS




The chart above shows the expected future development of the present population in simplified terms. The Retirement System presently covers 2,205 active members (excluding 631 members currently in the DROP). Eventually, 48 members are expected to terminate covered employment prior to retirement and forfeit eligibility for an employer provided benefit. 2,037 members are expected to receive monthly retirement benefits either by retiring directly from active service (including DROP), or by retiring from vested deferred status. 120 members are expected to become eligible for death-in-service or disability benefits.

# EXPECTED TERMINATIONS FROM ACTIVE EMPLOYMENT FOR CURRENT ACTIVE MEMBERS

Shown below is a graph of projected active members (excluding 631 members currently in the DROP) remaining in the Retirement System. It is projected that less than half of the current active population will be active by 2020.



# COMMENTS AND CONCLUSION

**Experience**

Experience was less favorable than assumed during the year ending June 30, 2016. The chart below shows the estimated experience loss.

**Development of Actuarial Gain/(Loss)**
**($ millions)**

| | $ Millions |
|---|---|
| (1) UAAL as of June 30, 2015 | $ 858.6 |
| (2) POA Contribution FY2016 | 37.8 |
| (3) Interest at 6.75% | 58.0 |
| (4) Assumption and method changes | 3.0 |
| (5) Projected UAAL* as of June 30, 2016 (1) - (2) + (3) + (4) | $ 881.8 |
| (6) Actual UAAL* as of June 30, 2016 | 1,051.3 |
| Gain (Loss): (5) - (6) | $ (169.5) |
| Gain (Loss) from Investments | (184.3) |
| Gain (Loss) from Liabilities | 14.8 |

** Unfunded Actuarial Accrued Liability.*

The main source of the loss was investment activity. Other gains and losses during the year were smaller and mostly offsetting. They include gains on turnover (less retirements and more quits than expected) and losses from benefit amounts (benefits were larger than projected from prior years' data).

**Year-to-Year Reconciliation of Projected June 30, 2024 Contributions**

The estimated FY 2024 contributions are very sensitive to changes in year-to-year experience. The chart below reconciles our estimate from the June 30, 2015 valuation to our estimate from this valuation (June 30, 2016).

| | $ Millions |
|---|---|
| Estimated FY 2024 Employer Contribution from 6/30/2015 Valuation | $ 124.1 |
| Assumption and Method Changes | 0.5 |
| Investment Loss | 29.4 |
| Other Experience | (2.4) |
| Estimated FY 2024 Employer Contribution (Level Principal) from 6/30/2016 Valuati | $ 151.6 |

# COMMENTS AND CONCLUSION

**Annuity Reserve Fund**

The Annuity Reserve Fund (ARF), as reported, was $47 million higher than the related accrued liabilities for Retirees and Beneficiaries. The Board adopted a motion to transfer $20 million to Component I to fund transition costs, leaving a contingency reserve of approximately $27 million. If the Board chooses to transfer some or all of the $27 million from the ARF to the Pension Accumulation Fund (PAF) within Component II, the transfer would reduce the UAAL.

**Annuity Savings Fund (ASF) Interest Credits**

The ASF fund is credited with the lesser of 5.25% interest and the total fund earnings. We understand that any earning in excess of 5.25% (that otherwise would have been credited to the ASF fund if not for the 5.25% cap) will be transferred to Component I assets, to the extent needed, for funding of transition liability. Since ASF liabilities are equal to ASF balances, we did not model any such excess earnings as part of this valuation.

**Reserves**

The Annuity Reserve Fund was not credited with any interest during the year. The interest credit to the Annuity Savings Fund is approximately 7.5% of the beginning year ASF balance. However, that amount is approximately 5.2% of the sum of the ASF and ARF at the beginning of the year. We therefore recommend that the development of these reserves be reviewed. Note ASF interest credits are determined by Plan provisions and Board policy and are calculated by System staff.

**Census Data and Approximations**

The data provided for this valuation did not reflect the plan freeze or changes to active member benefits that were instituted in connection with the POA. Consequently, it was necessary to use approximations to estimate the frozen accrued benefits. While in our judgement the approximations are reasonable, an estimate of the potential range of error in those approximations was outside the scope of this study. It is important that complete census data be provided to us for the valuation to minimize the probability of an important decision being made based upon estimated data. We would be pleased to redo this valuation with revised data if such can be made available.

For active members, Average Final Compensation (AFC) amounts and total service were reported as of June 30, 2016 (with an additional year of service and pay after the freeze). For purposes of this valuation, we matched the June 30, 2016 actives to the active data reported for the June 30, 2014 valuation to obtain the AFC and benefit service amounts as of June 30, 2014 (the date of the Plan freeze). We reviewed sample benefit calculations and updated any adjustments, as needed. This process was based on discussions with System staff and the Plan's auditors.

Data was reported separately for Component I and Component II. Additional time was needed to reconcile these two data sets as they came from different source data. Processing time for the valuation could be shortened if data for future valuations is reconciled before being provided to GRS. We would be happy to work with the Retirement System staff to help them provide the information that is needed for the valuation.

**Disability Retirees**

The Police and Fire Retirement System Combined Plan provides disability benefits from both Component I and Component II. Our understanding of the Component II freeze as it relates to duty disability benefits was that the only benefit payable from Component II would be the frozen accrued benefit, payable at the time of conversion to normal retirement (for members becoming disabled after 6/30/2014) and that any benefits payable during the period of disability would be paid from Component I. Data reported for this valuation is not consistent with that understanding. In addition, assets reported for Component I do not appear to be consistent with that interpretation. We recommend the administration of the post-2014 duty disability benefits be reviewed.

**Option Factors**

The Board adopted new option factors for the Plan. However, we have not been provided with an effective date for the new factors. For the sake of simplicity, we have assumed the new factors apply to all retirements after the valuation date.

**Actuarial Assumptions**

The Retirement System routinely has five-year experience studies in accordance with the City ordinance. The last experience study for the period from July 1, 2007 through June 30, 2012 was started but not completed due to the bankruptcy. We conducted a review of the mortality experience in 2013. We recommend that the System consider the experience study schedule. The next experience study would be scheduled for the period from July 1, 2012 through June 30, 2017. However, in order to avoid distortions from the bankruptcy, the next experience study could be scheduled to begin just after the City emerged from bankruptcy. This, however, would suggest a study based on the period July 1, 2015 through June 30, 2020.

**Additional Contributions**

We understand the City has set aside a total of $30 million to be contributed to the General and Police and Fire Component II (Legacy) plans. We have not included any of this money in the valuations or projections since: 1) it has not been determined how the money will be split between the two legacy plans; and 2) there is no legal opinion of which we are aware that would indicate that the City could not decide to use the money for another purpose rather than contributing to the funds. Once the money has been contributed (or has been legally determined to be irrevocably allocated to the trust), we will reflect it.

**Restoration**

This valuation assumes no future restoration of Component II benefits. Calculations related to restoration will be provided in a separate report at the Board's request. Any future restoration will be reflected beginning in the next valuation after being granted.

**Future Results**

While FY 2017 investment performance has not yet been provided to us, the S&P 500 and the DOW have so far both returned more than 6.75%. If the Retirement System's experience is similar, this will result in upward pressure on the funded status and downward pressure on the FY 2024 contribution requirements (below what is shown in this report).

The POA mandated contributions for FY 2017 and beyond are expected to defund the Retirement System, even if all assumptions are realized. In FY 2017, the POA mandated contributions will be about ¼ of the interest accrued on the UAAL.

**Recommendation 1**

**We recommend that every potential action be taken to generate contributions to the Retirement System above those provided in the POA.**

**Recommendation 2**

We recommend that the Retirement System compute frozen accrued benefits as soon as possible and report them to the Actuary for the June 30, 2017 valuation. If important decisions are to be made based on this valuation, we recommend that the valuation be redone based upon actual computed frozen accrued benefits before any such decisions are made.

**Recommendation 3**

We recommend that a study be undertaken to develop a Board funding policy for FY 2024 and beyond. The increase in contributions that is expected at that time is so extreme that it cannot be ignored until then. All stakeholders should agree on the funding policy well before that date comes. If not, there could be an increased risk of contribution defaults increasing benefit security risk.

**Conclusion**

The POA contributions fall short of contributions that would result from either of the funding policies illustrated in this report by a significant amount. Given these contribution shortfalls it is unlikely that investment gains in FY 2017 will be significant enough to offset the shortfalls, so the funding status is expected to decline in the next valuation.

The FY 2024 contribution is expected to be very high compared to City contributions in the immediately preceding years. Planning for the FY 2024 contribution level is very important. **Once again, we recommend that every potential action be taken to generate contributions to the Retirement System above and beyond those provided in the POA.**

# DATA FURNISHED FOR VALUATION

## *Component II Frozen Benefits*

*All Component II benefits are frozen as of June 30, 2014 based on service and average final compensation accrued as of that date and the provisions of the Detroit Police and Fire Retirement System as it existed on June 30, 2014 and all future Cost-of-Living Adjustments ("COLA's") were reduced from 2.25% to 1.0125% per year. The benefits evaluated in this report are the frozen reduced benefits. Component II benefits are payable after separation from service, upon meeting the eligibility conditions of the plan as it existed on June 30, 2014, regardless of whether the individual is eligible to receive a Component I benefit at that time.*

*Our understanding of the June 30, 2014 plan provisions is provided below for completeness. The material below is a non-legal summary and is not intended to cover all potential situations that could occur. If there are discrepancies between the description below, and appropriate legal documents, the latter necessarily govern.*

## *Age and Service Retirement*

***Eligibility*** - 25 years of service regardless of age. 20 years of service regardless of age for eligible DPOA and DFFA members. DFFA members must retire by age 60.

***Annual Amount*** - An annuity equal to the actuarial equivalent of the member's accumulated contribution account plus a defined benefit, which, when added to the annuity will provide the following:

**Pre-1969 Members** - For all service earned up to April 5, 2011 for LSA and Fire equivalent members, and up to September 1, 2011 for DPOA and Fire equivalent members, 2.5% of AFC times the first 25 years of service, with a maximum allowance of 15/22 of a police officer's or firefighter's annual rate of compensation (actuarially reduced to reflect early payment).

For all service earned after April 5, 2011 for LSA and Fire equivalent members, and after September 1, 2011 for DPOA and Fire equivalent members, 2.1% of AFC times the first 25 years of service, with a maximum allowance of 15/22 of a police officer's or firefighter's annual rate of compensation.

**1969 Plan Members** - For all service earned up to April 5, 2011 for LSA and Fire equivalent members, and up to September 1, 2011 for DPOA and Fire equivalent members, 2.5% of AFC times the first 25 years of service plus 2.1% of AFC times each of the next 10 years of service.

For all service earned after April 5, 2011 for LSA and Fire equivalent members, and after September 1, 2011 for DPOA and Fire equivalent members, 2.1% of AFC times each year of service, up to 35 years of service.

Members may elect to receive their accumulated contribution account in a lump sum after 25 years of service (20 years of service for eligible DPOA and DFFA members). The defined benefit at retirement is then reduced by the actuarial equivalent of the amount of principal withdrawn. No reduction is made with regard to the interest portion of the withdrawal. Pre-1969 plan members may elect 1969 plan benefits at the time of retirement.

***Type of Average Final Compensation (AFC)*** - Average of the current compensation for the ranks held in each of last 5 years (last 3 years for DPCOA, Executive Members and their Fire equivalents). Pension benefits for non-union employees may not be diminished due to a reduction in compensation because of fiscal emergency. AFC includes prior longevity distributions during the averaging period in accordance with the following schedule: 1% of compensation after 5 years of service, 2% after 11 years, 3% after 16 years and 4% after 21 years. A member may elect that upon retirement or upon death before retirement either (i) a lump sum payment equal to 85% (100% for DPOA and DPCOA members) of the amount of his or her unused accumulated sick leave bank, or (ii) to have the 3-year average of 25% of the value of the accumulated unused sick leave bank added to his or her AFC. Any member electing the AFC adjustment option will also be paid a lump sum equal to the remaining value of the sick leave bank as provided in (i) above. Lump sum payments are not paid by the Retirement System.

### *Deferred Retirement (vested benefit)*

***Eligibility*** - 10 years of service for DPOA and Fire equivalents, age 40 with 8 years of service for all others.

***Annual Amount*** - Same as regular retirement but based on average final compensation and credited service at the time of termination.

***Benefit Commencement - DPOA and Fire equivalent members hired after 6/30/1985***: Unreduced benefit begins at age 62. ***All other members***: Unreduced benefit begins at the age when the member would have first been eligible for regular retirement had the member continued in City service. **All** members may elect a reduced benefit payable immediately.

**Note, for valuation purposes, the frozen accrued benefit was valued in the event of a death or disability. The following death and disability provisions are provided for historical purposes only.**

### *Duty Disability Retirement*

***Eligibility*** - No age or service requirement.

***Annual Amount –*** A basic benefit of 50% of final compensation as of June 30, 2014 and a supplemental benefit of 16-2/3% of final compensation as of June 30, 2014 is payable for 24 months. After 24 months, members disabled from any occupation continue to receive both benefits; otherwise, only the 50% benefit is then payable. Upon attaining 25 years of service, the disability benefit is 50% of final compensation as of June 30, 2014. Members convert to regular retirement benefit at age 65. Worker's compensation payments are offset. Members who have already filed under the old duty disability plan will receive 66-2/3% of final compensation as of June 30, 2014 payable to eligibility date for regular retirement.

### *Non-Duty Disability Retirement*

***Eligibility*** - 5 years of service.

***Annual Amount*** - Computed as a regular retirement benefit, but based on average final compensation and credited service at the time of disability. Minimum benefit is 20% of average final compensation.

### *Duty Death Before Retirement*

***Eligibility*** - No age or service requirement.

## SUMMARY OF BENEFIT PROVISIONS (JUNE 30, 2016) (CONCLUDED)

***Annual Amount*** **-** Surviving spouse receives 5/11 of police officer's or firefighter's compensation and each child under age 18 receives 1/10 of such compensation with a maximum total of 7/33 of such compensation as of June 30, 2014. If there is no surviving spouse, each child receives 1/4 of such compensation with a maximum total of 1/2 of such compensation. If there is no surviving spouse or children, each dependent parent receives 1/6 of such compensation. Worker's compensation payments are offset.

### *Non-Duty Death Before Retirement*

***Eligibility*** - No age or service requirement.

***Annual Amount*** - Same as a regular retirement benefit to a surviving spouse, but reduced in accordance with a 100% joint and survivor option election. Minimum benefit is 20% of average final compensation as of June 30, 2014. Each child under 18 receives 1/7 of Police Officer's or Firefighter's compensation with a maximum total of 2/7 of such compensation. If there is no spouse or children, each dependent parent receives 1/7 of such compensation.

### *Post-Retirement Cost-of-Living Adjustments*

**Pre-1969 Members** - Allowances increase in proportion to active member compensation for the corresponding rank. These increases are not considered COLAs and are therefore not reduced under the POA.

**1969 Plan Members** - Police retired after July 1, 2001, certain Police classes retired after July 1, 1998 and all Fire members: For all service earned up to April 5, 2011 for LSA members (September 1, 2011 for DPOA members) pensions increase by 2.25% of the **current** pension amount each July 1. No cost-of-living adjustments for service earned after April 5, 2011 for LSA members (September 1, 2011 for DPOA members). COLA is reduced by 45% according to the POA.

### *Member Contributions*

5% of covered compensation payable until first eligible for regular retirement.

### *DROP Plan*

Members with 25 years (20 years for DPOA members) of service may elect to participate in the DROP. When a DROP election is made, the member ceases to accrue any further age and service retirement benefits. Seventy-five percent (75%) of the member's benefit (accrued to their DROP date) is contributed to a DROP account (a defined contribution account). At retirement the member is entitled to the balance in the DROP account and a monthly benefit equal to 100% of their benefit accrued to their DROP date, increased by any post-retirement increases that the member would have received, had the member been retired. Fire members must retire from the DROP plan at age 60. Participation in the DROP is limited to 10 years for LSA members electing to DROP after April 5, 2011.

## *Reported Assets*
## (Market Value)

| Market Value - June 30, 2016 | |
|---|---|
| Cash & Deposits | N/A |
| Receivables | N/A |
| Domestic Equities | N/A |
| Fixed Income | N/A |
| Real Estate | N/A |
| Other | N/A |
| Accounts Payable | N/A |
| **Total Current Assets** | **$ 2,950,470,450** |

## *Reserve Accounts*

| Funds | Fund Balances June 30, 2016 | Fund Balances June 30, 2015 |
|---|---|---|
| Annuity Savings | $ 104,670,218 | $ 114,632,702 |
| Annuity Reserve | 50,666,639 | 50,961,990 |
| Total Annuity Funds | 155,336,857 | 165,594,692 |
| Pension Accumulation | (32,359,899) | (195,070,640) |
| Pension Reserve | 2,821,565,851 | 3,218,090,945 |
| Accrued Liability Fund Reserve | 0 | 0 |
| Survivor Benefit | 5,927,641 | 6,139,444 |
| Market Stabilization Fund | 0 | 0 |
| Total Pension Funds | 2,795,133,593 | 3,029,159,749 |
| Total Fund Balances | $2,950,470,450 | $3,194,754,441 |

## *Revenues and Expenditures*

| | Pension Funds | Annuity Funds + | Total Funds |
|---|---|---|---|
| Market Value July 1, 2015 | $ 3,029,159,749 | $ 165,594,692 | $3,194,754,441 |
| Revenues | | | |
| Member Contributions | 24,801 | 0 | 24,801 |
| Employer Contributions | 37,787,744 | 0 | 37,787,744 |
| Investment Income | 29,216,225 | 8,568,005 | 37,784,230 |
| Less Investment Expense | (13,165,657) | 0 | (13,165,657) |
| Other Income | 855,743 | 0 | 855,743 |
| Total | $ 54,718,856 | $ 8,568,005 | $ 63,286,861 |
| Expenditures | | | |
| Benefit Payments | 285,641,323 | 295,351 | 285,936,674 |
| Refund of Member Contributions | 0 | 18,530,489 | 18,530,489 |
| Adjustment (Prior Year Cont.) | 0 | 0 | 0 |
| Administrative Expenses | 3,103,689 | 0 | 3,103,689 |
| Total | $ 288,745,012 | $ 18,825,840 | $ 307,570,852 |
| Other Adjustment | $ 0 | $ 0 | $ 0 |
| Market Value June 30, 2016 | $2,795,133,593 | $ 155,336,857 | $2,950,470,450 |
| Market Value Rate of Return | 0.4% | 5.5% | 0.7% |

\+ *Reported Market Value of Annuity Savings Fund (ASF) and Annuity Reserve Fund (ARF). The ARF is credited with a fixed rate of return by the Plan document/ordinance. ASF interest credit is determined by the Board based on parameters set forth in the Plan document/ordinance.*

Rates of return are dollar weighted estimates assuming mid-year cash flows.

# RETIREES AND BENEFICIARIES AS OF JUNE 30, 2016
# TABULATED BY ATTAINED AGE@

| Attained Age | Age & Service No. | Age & Service Monthly Allowances | Disability No. | Disability Monthly Allowances | Death-in-Service No. | Death-in-Service Monthly Allowances | Totals No. | Totals Monthly Allowances |
|---|---|---|---|---|---|---|---|---|
| Under 20* | 5 | $ 20,949 | | | 42 | $ 20,856 | 47 | $ 41,805 |
| 20-24 | 3 | 6,092 | | | | | 3 | 6,092 |
| 25-29 | 1 | 1,792 | 1 | $ 2,960 | | | 2 | 4,752 |
| 30-34 | 3 | 5,528 | 3 | 9,792 | 0 | 0 | 6 | 15,320 |
| 35-39 | 9 | 13,896 | 56 | 168,692 | 8 | 13,604 | 73 | 196,192 |
| 40-44 | 33 | 62,127 | 78 | 243,949 | 16 | 25,986 | 127 | 332,062 |
| 45-49 | 158 | 336,607 | 104 | 324,111 | 11 | 18,273 | 273 | 678,991 |
| 50-54 | 319 | 886,176 | 125 | 371,670 | 12 | 23,289 | 456 | 1,281,135 |
| 55-59 | 440 | 1,258,681 | 122 | 330,107 | 22 | 43,779 | 584 | 1,632,567 |
| 60-64 | 905 | 2,778,765 | 237 | 652,993 | 32 | 56,063 | 1,174 | 3,487,821 |
| 65-69 | 1,453 | 4,616,244 | 462 | 1,139,476 | 55 | 99,384 | 1,970 | 5,855,104 |
| 70-74 | 1,056 | 3,074,140 | 295 | 707,477 | 29 | 47,240 | 1,380 | 3,828,857 |
| 75-79 | 594 | 1,602,013 | 110 | 257,993 | 16 | 28,939 | 720 | 1,888,945 |
| 80-84 | 410 | 931,989 | 44 | 116,176 | 12 | 26,281 | 466 | 1,074,446 |
| 85-89 | 445 | 971,721 | 60 | 149,958 | 23 | 46,466 | 528 | 1,168,145 |
| 90-94 | 282 | 568,041 | 27 | 66,445 | 8 | 16,438 | 317 | 650,924 |
| 95 & Over | 67 | 112,888 | 11 | 30,003 | 0 | 0 | 78 | 142,891 |
| **Totals** | **6,183** | **$17,247,649** | **1,735** | **$4,571,802** | **286** | **$466,598** | **8,204** | **$22,286,049** |

@ *Includes both pre-1969 and 1969 retirees. Allowances being paid to DROP members are not reflected. Allowances shown are amounts as reported in the data.*

* *May include records with incorrect birth dates reported.*

# INACTIVE VESTED MEMBERS JUNE 30, 2016

| Attained Age | No. | Estimated Annual Allowances |
|---|---|---|
| Under 40 | 75 | $1,338,365 |
| 40-44 | 96 | 1,880,905 |
| 45-49 | 81 | 1,803,706 |
| 50-54 | 45 | 1,040,491 |
| 55-59 | 31 | 770,005 |
| 60-64 | 15 | 351,501 |
| 65 & over | 26 | 735,439 |
| **Totals** | **369** | **$7,920,412** |

# PRE-1969 RETIREES AND BENEFICIARIES AS OF JUNE 30, 2016
# TABULATED BY ATTAINED AGE

| Attained Age | Age & Service# | | Disability# | | Death-in-Service | | Totals | |
|---|---|---|---|---|---|---|---|---|
| | No. | Monthly Allowances | No. | Monthly Allowances | No. | Monthly Allowances | No. | Monthly Allowances |
| Under 20* | | | | | | | | |
| 35-39 | 2 | $ 2,834 | 1 | $ 2,554 | | | 3 | $ 5,388 |
| 45-49 | 1 | 1,093 | | | | | 1 | 1,093 |
| 55-59 | 7 | 6,703 | | | 0 | $ 0 | 7 | 6,703 |
| 60-64 | 6 | 9,658 | | | 2 | 4,010 | 8 | 13,668 |
| 65-69 | 75 | 133,575 | 12 | 26,275 | 11 | 21,786 | 98 | 181,636 |
| 70-74 | 308 | 626,800 | 124 | 282,831 | 13 | 25,422 | 445 | 935,053 |
| 75-79 | 327 | 707,508 | 82 | 184,252 | 14 | 23,973 | 423 | 915,733 |
| 80-84 | 279 | 552,077 | 32 | 71,923 | 8 | 16,097 | 319 | 640,097 |
| 85-89 | 305 | 583,229 | 55 | 136,592 | 21 | 40,726 | 381 | 760,547 |
| 90-94 | 246 | 472,225 | 26 | 62,786 | 8 | 16,438 | 280 | 551,449 |
| 95 & Over | 64 | 107,807 | 11 | 30,003 | 0 | 0 | 75 | 137,810 |
| **Totals** | **1,620** | **$3,203,509** | **343** | **$797,216** | **77** | **$148,452** | **2,040** | **$4,149,177** |

** May include records with incorrect birth dates reported.*
*# Includes survivor beneficiaries of service and disability retirees.*

# DROP PARTICIPANTS JUNE 30, 2016

| Attained Age | No. | Estimated Monthly Allowances & |
|---|---|---|
| 20-24 | 1 | $ 1,397 |
| 35-39 | 2 | 2,673 |
| 40-44 | 37 | 55,012 |
| 45-49 | 124 | 243,706 |
| 50-54 | 208 | 515,307 |
| 55-59 | 173 | 502,362 |
| 60-64 | 65 | 231,901 |
| 65-69 | 19 | 73,213 |
| 70-74 | 2 | 8,857 |
| **Totals** | **631** | **$1,634,428** |

*& Reflects the 75% of reported monthly benefits being paid into DROP accounts.*

# ACTIVE MEMBERS AS OF JUNE 30, 2016
# BY ATTAINED AGE AND YEARS OF SERVICE (EXCLUDES DROP)

Note the following active member schedules show eligibility service (total service) and reported payroll as of the valuation date. However, benefits are based on service and AFC as of June 30, 2014.

## *Police Members*

| Attained Age | Years of Service to Valuation Date | | | | | | | Totals | |
|---|---|---|---|---|---|---|---|---|---|
| | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30 Plus | No. | Valuation Payroll * |
| 20-24 | 22 | | | | | | | 22 | $ 961,406 |
| 25-29 | 61 | 39 | | | | | | 100 | 4,962,547 |
| 30-34 | 29 | 70 | 29 | 4 | | | | 132 | 7,094,526 |
| 35-39 | 12 | 47 | 62 | 167 | 1 | | | 289 | 16,362,664 |
| 40-44 | 5 | 26 | 31 | 330 | 55 | | | 447 | 26,640,575 |
| 45-49 | 3 | 16 | 23 | 257 | 108 | 9 | | 416 | 25,452,692 |
| 50-54 | 3 | 5 | 6 | 103 | 45 | 9 | 2 | 173 | 10,409,389 |
| 55-59 | 1 | 2 | 2 | 33 | 11 | 3 | 1 | 53 | 3,138,237 |
| 60 | | | 1 | 2 | 3 | | | 6 | 394,886 |
| 61 | | | | | 1 | 1 | | 2 | 201,530 |
| 62 | | | | 1 | | 1 | | 2 | 110,328 |
| 63 | | | | | | | 1 | 1 | 76,783 |
| 65 | | | | | | | 1 | 1 | 46,600 |
| 67 | | | | 1 | | | | 1 | 56,268 |
| 68 | | | | | | 1 | | 1 | 57,095 |
| **Totals** | **136** | **205** | **154** | **898** | **224** | **24** | **5** | **1,646** | **$95,965,526** |

## *Fire Members*

| Attained Age | Years of Service to Valuation Date | | | | | | | Totals | |
|---|---|---|---|---|---|---|---|---|---|
| | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30 Plus | No. | Valuation Payroll * |
| 20-24 | 11 | | | | | | | 11 | $ 477,356 |
| 25-29 | 23 | 3 | 2 | | | | | 28 | 1,209,356 |
| 30-34 | 18 | 5 | 7 | | | | | 30 | 1,505,868 |
| 35-39 | 6 | 13 | 34 | 44 | | | | 97 | 5,123,676 |
| 40-44 | 2 | 4 | 27 | 90 | 15 | | | 138 | 7,591,113 |
| 45-49 | 2 | 2 | 16 | 66 | 47 | 17 | | 150 | 8,503,781 |
| 50-54 | | 2 | 6 | 20 | 18 | 32 | 3 | 81 | 5,056,883 |
| 55-59 | | | 1 | 7 | 8 | 2 | 4 | 22 | 1,314,205 |
| 60 | | | 1 | | | 1 | | 2 | 117,412 |
| **Totals** | **62** | **29** | **94** | **227** | **88** | **52** | **7** | **559** | **$30,899,650** |

* *Valuation payroll is the greater of the current year and prior year reported pay.*

# TOTAL ACTIVE MEMBERS AS OF JUNE 30, 2016
# BY ATTAINED AGE AND YEARS OF SERVICE (EXCLUDES DROP)

Note the following active member schedules show eligibility service (total service) and reported payroll as of the valuation date. However, benefits are based on service and AFC as of June 30, 2014.

**Total Members**

| Attained Age | Years of Service to Valuation Date | | | | | | | Totals | |
|---|---|---|---|---|---|---|---|---|---|
| | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30 Plus | No. | Valuation Payroll * |
| Under 20 | | | | | | | | | |
| 20-24 | 33 | | | | | | | 33 | $ 1,438,762 |
| 25-29 | 84 | 42 | 2 | | | | | 128 | 6,171,903 |
| 30-34 | 47 | 75 | 36 | 4 | | | | 162 | 8,600,394 |
| 35-39 | 18 | 60 | 96 | 211 | 1 | | | 386 | 21,486,340 |
| 40-44 | 7 | 30 | 58 | 420 | 70 | | | 585 | 34,231,688 |
| 45-49 | 5 | 18 | 39 | 323 | 155 | 26 | | 566 | 33,956,473 |
| 50-54 | 3 | 7 | 12 | 123 | 63 | 41 | 5 | 254 | 15,466,272 |
| 55-59 | 1 | 2 | 3 | 40 | 19 | 5 | 5 | 75 | 4,452,442 |
| 60 | | | 2 | 2 | 3 | 1 | | 8 | 512,298 |
| 61 | | | | | 1 | 1 | | 2 | 201,530 |
| 62 | | | | 1 | | 1 | | 2 | 110,328 |
| 63 | | | | | | | 1 | 1 | 76,783 |
| 64 | | | | | | | | | |
| 65 | | | | | | | 1 | 1 | 46,600 |
| 66 | | | | | | | | | |
| 67 | | | | 1 | | | | 1 | 56,268 |
| 68 | | | | | | 1 | | 1 | 57,095 |
| 72 | | | | | | | | | |
| **Totals** | **198** | **234** | **248** | **1,125** | **312** | **76** | **12** | **2,205** | **$126,865,176** |

* *Valuation payroll is the greater of the current year and prior year reported pay.*

| | Group Averages | | |
|---|---|---|---|
| | **Police** | **Fire** | **Total** |
| Age: | 42.1 years | 42.8 years | 42.3 years |
| Service: | 15.4 years | 16.1 years | 15.5 years |
| Annual Pay: | $58,302 | $55,277 | $57,535 |

# RECONCILIATION OF REPORTED DATA AS OF JUNE 30, 2016

## Active Data

| | | |
|---|---|---|
| A) | Number reported in PF_Benefits table | 3,346 |
| B) | Excluded due to inactive status/DROP | (755) |
| C) | Non Benefit Class Code | (21) |
| D) | Active members hired after June 30, 2014 | (284) |
| E) | Adjustments per data questions | (81) |
| F) | Number of records valued | 2,205 |

## Retired Data

| | | |
|---|---|---|
| A) | Number of records reported on data file | 41,701 |
| B) | Number of records not in P/F plan | (26,254) |
| C) | Records not currently in receipt of benefits | (6,514) |
| D) | Component I (Hybrid) records | (98) |
| E) | Records in DROP | (631) |
| F) | Number of records valued: | 8,204 |

## Deferred Data

| | | |
|---|---|---|
| A) | Number of records reported on data file | 342 |
| B) | Records with service less than 8 years | (22) |
| C) | From General File | 12 |
| D) | Adjustments per data questions | 41 |
| E) | Number of records valued | 373 |

# DATA APPROXIMATIONS AND ASSUMPTIONS

**Active**

For active members, AFC amounts and total service as of June 30, 2016 (rather than at the freeze date) were reported. For purposes of this valuation, we matched the June 30, 2016 actives to the active data reported for the June 30, 2014 valuation to obtain the AFC and benefit service amounts as of June 30, 2014. In cases where June 30, 2014 AFC was not available, June 30, 2016 AFC was used. The class code used to distinguish between LSA and DPOA was taken from the data as of June 30, 2014 valuation.

**Deferred**

Data provided for deferred vested members was incomplete. As part of the processing of deferred member data, we attempted to fill in missing data with data from; 1) the previous year's deferred file; 2) the current year's active file and/or; 3) the previous year's active files. In cases where AFC was still incomplete after comparing to other files, we used $30,000 to estimate the AFC. Since vesting service is not directly provided on the file, we estimated vesting service based on reported benefit service increased by the elapsed time between date of termination and June 30, 2014. Members with estimated vesting service of less than 8 years were assumed to be non-vested and were not valued.

**Retired and Beneficiary**

Adjustment assumptions include:

- In cases where the benefit is identified to be a joint and survivor benefit and a beneficiary is not listed in the data, it was assumed that male spouses were 3 years older than females;
- For non-equated members that elected a pop-up benefit, the pop-up amount is estimated based on the chosen option and benefit amounts provided in the data;
- Benefits for dependent children are assumed to cease at age 21; and
- For non-converted disabled members, converted benefits are:
    - assumed to commence at age 65; and
    - estimated, reflecting the changes from 66-2/3% of Final Compensation to 50% of Final Compensation.

# APPENDIX

## ASSUMPTION REVIEW

**All assumptions are estimates of future experience except as noted. If the rationale for the assumptions is based on experience studies, it is noted.**

## ECONOMIC ASSUMPTIONS

***The investment return rate*** used in the valuation was 6.75% per year, compounded annually (net of investment and administrative expenses). This assumption is prescribed by the Eighth Amended Plan for the Adjustment of Debts of the City of Detroit (POA).

***Price inflation*** is not directly used in the valuation. For purposes of assessing the reasonability of the investment return assumption we assumed price inflation of 2.25% per year.

## NON-ECONOMIC ASSUMPTIONS

***The mortality table*** used to measure retired life mortality is the RP-2014 Blue Collar Annuitant Table for males and females. Tables were extended below age 50 with a cubic spline to the published Juvenile rates. Pre-retirement mortality is the RP-2014 Blue Collar Employee Tables for males and females. The tables are projected to be fully generational, based on the 2-dimensional, sex distinct mortality improvement scale MP-2014. This table was first used as of June 30, 2014. The rationale for the mortality assumption is based on the 2008-2013 Mortality Experience Study issued February 13, 2015.

***The probabilities of age/service retirement*** for members eligible to retire are shown on page 28. The rationale is based on the 2002-2007 Experience Study. However, probabilities were modified effective with the June 30, 2014 valuation to reflect a change in the modeling of future DROP members, consistent with the plan closure. The revised probabilities were selected so that, when combined with the model change, the effect on the present value of benefits would be immaterial.

***The probabilities of separation*** from service (including *death-in-service*) are shown for sample ages on page 29. These probabilities were first used for the June 30, 2008 valuation. The rationale is based on the 2002-2007 Experience Study.

# MISCELLANEOUS AND TECHNICAL ASSUMPTIONS
# JUNE 30, 2016

| | |
|---|---|
| **Marriage Assumption:** | 100% of males and 100% of females are assumed to be married for purposes of death-in-service benefits. This assumption accounts for potential dependent children/dependent parent death benefits. No other assumption is made for surviving children/dependent parents. Male spouses are assumed to be three years older than female spouses. |
| **Pay Increase Timing:** | N/A |
| **Decrement Timing:** | Decrements are assumed to occur mid-year. |
| **Eligibility Testing:** | Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date of decrement. |
| **Decrement Relativity:** | Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects. |
| **Decrement Operation:** | Disability and mortality decrements do not operate during the first 5 years of service. Disability and withdrawal do not operate during retirement eligibility. |
| **Incidence of Contributions:** | Employer contributions are assumed to be received on the last day of the fiscal year. |
| **Longevity in AFC:** | Longevity payments were included directly in the AFC data provided by the System. No further adjustment was included. |
| **Unused Sick Leave Payout:** | Sick leave banks as of June 30, 2014 were included in data provided by the System. No further adjustment was included. |
| **Post-Retirement COLA:** | Active members are assumed to receive a 0.9% COLA rather than 1.0125% because the annuity portion is not subject to the COLA. Post-retirement increases for retired members were based on the plan in effect at retirement. For the pre-69 plan members, future COLA's are assumed to be the same as wage inflation for active members (not reduced in POA). For other members retiring before 2014, the COLA rate is prorated by the ratio of COLA eligible service to total service at retirement before applying the POA mandated reduction to 1.0125%. The service ratio is provided on the data file. |
| **AFC Period:** | AFC data was provided by the System for the June 30, 2014 (date of freeze) valuation. |
| **Disability Change Age:** | The duty disability benefit is assumed to change at normal retirement age. |

# Miscellaneous and Technical Assumptions
# June 30, 2016
# (Concluded)

| | |
|---|---|
| **DROP Assumption:** | All active members not in the DROP are assumed to have a 40% chance of retiring or entering the DROP in their first five years of retirement eligibility with a 60% chance of entering the DROP. |
| **Workers Comp Offset:** | No Workers Compensation offsets are assumed for duty disability benefits. |
| **DROP Account:** | DROP account balances are not reported. No liability is included for DROP account balances. |
| **Class Codes:** | For valuation purposes, members are categorized as DPOA, DFFA or LSA based on class codes provided by the Retirement System and are primarily used in the valuation to determine normal retirement eligibility (20 & Out versus 25 & Out). Therefore, counts in the valuation may not represent actual membership in the respective associations. |
| **Frozen Benefit Estimate:** | Reported AFC as of June 30, 2014 was adjusted to include 25% of unused sick leave (to a maximum of 25 days per year of service) plus a load of 10% to provide consistency with a sample of actual computations.* |
| **Form of Payment:** | The actuarial equivalent basis for optional forms of payment and early retirement are based on the RP-2014 Mortality Table with Blue Collar adjustments projected 11 years, a 6.75% interest rate, 90%/10% unisex mix and a 1.0125% COLA assumption per System Policy. Annuity withdrawal factors use the same mortality and interest rate assumptions with a 0% COLA assumption. No adjustment has been made for alternate forms of payment elections. Principal balances of accumulated member contributions were converted to life annuity offsets based on plan factors for the valuation. |
| **Retiree Pop-Up Factor** | If a retiree has a pop-up option but no pop-up factor is provided in the data, the pop-up factor is determined by using an average age at retirement of 50.2, beneficiary age of 47.2, and the optional form of payment assumptions (determined above). |
| **Member Contributions** | Member contributions to this Component II plan are assumed to have ceased with the bankruptcy. |

The rationale for the miscellaneous and technical assumptions is the 2002-2007 Experience Study, modified as necessary for changes in data or administration.

* *The Load was developed based on a sample of members who retired after June 30, 2014 by comparing their actual AFC (from their final benefit calculation) to their AFC reported in the June 30, 2014 active data file. This load was updated for the 2016 valuation based on a sample of members who retired after June 30, 2016.*

# FUNDING METHODS

***The unit credit cost method*** was used in determining liabilities and normal cost. Under this method, there is no normal cost since benefits are frozen and there are no future accruals and Actuarial Accrued Liability is the present value of each individual's accrued benefit.

***Unfunded Actuarial Accrued Liabilities (UAAL).*** UAAL contribution is not actuarially determined. Actual employer contributions through June 30, 2023 are set by the POA. The funding policy after 2023 has not yet been established by the Board.

***Employer contribution dollars*** were assumed to be *paid in a single sum on the last day* of the employer fiscal year. (Adopted for the June 30, 1979 actuarial valuation.)

***Present assets*** are set equal to the Market Value in accordance with the POA.

***The data about persons now covered and about present assets*** was furnished by the System's administrative staff. Although examined for general reasonableness, the data was not audited by the actuary.

# SINGLE LIFE RETIREMENT VALUES BASED ON RP-2014 BLUE COLLAR FOR MALES AND FEMALES

| Sample Attained Ages in 2016 | Future Life Expectancy (years) | |
|---|---|---|
| | Men | Women |
| 45 | 38.98 | 42.36 |
| 50 | 34.03 | 37.30 |
| 55 | 29.26 | 32.39 |
| 60 | 24.71 | 27.62 |
| 65 | 20.38 | 23.03 |
| 70 | 16.35 | 18.69 |
| 75 | 12.68 | 14.70 |
| 80 | 9.46 | 11.15 |

# PROBABILITIES OF SERVICE RETIREMENT

| Service | Percent of Eligible Active Members Retiring within Next Year | | | |
|---|---|---|---|---|
| | Police | | Fire | |
| | 20 & Out | 25 & Out | 20 & Out | 25 & Out |
| 19 | 40% | | 40% | |
| 20 | 40% | | 40% | |
| 21 | 40% | | 40% | |
| 22 | 40% | | 40% | |
| 23 | 40% | | 40% | |
| 24 | 100% | 40% | 100% | 40% |
| 25 | 100% | 40% | 100% | 40% |
| 26 | 100% | 40% | 100% | 40% |
| 27 | 100% | 40% | 100% | 40% |
| 28 | 100% | 40% | 100% | 40% |
| 29 | 100% | 100% | 100% | 100% |
| 30 | 100% | 100% | 100% | 100% |
| 31 | 100% | 100% | 100% | 100% |
| 32 | 100% | 100% | 100% | 100% |
| 33 | 100% | 100% | 100% | 100% |
| 34 | 100% | 100% | 100% | 100% |
| 35 | 100% | 100% | 100% | 100% |
| 36 | 100% | 100% | 100% | 100% |
| 37 | 100% | 100% | 100% | 100% |
| 38 | 100% | 100% | 100% | 100% |
| 39 | 100% | 100% | 100% | 100% |
| 40 | 100% | 100% | 100% | 100% |
| Ref | 922 | 922 | 922 | 922 |

| Age | Percent of Eligible Active Members Retiring within Next Year | |
|---|---|---|
| | Police | Fire |
| 60 | 40% | 100% |
| 61 | 40% | 100% |
| 62 | 40% | 100% |
| 63 | 40% | 100% |
| 64 | 40% | 100% |
| 65 | 100% | 100% |
| 66 | 100% | 100% |
| 67 | 100% | 100% |
| 68 | 100% | 100% |
| 69 | 100% | 100% |
| 70 | 100% | 100% |
| Ref | 922 | 1 |

Members eligible for 20 & Out are assumed to be first eligible for normal retirement after 19 years of service due to their ability to (and experience of) purchase service. Members eligible for 25 & Out are assumed to be eligible for normal retirement after 24 years of service due to their ability to (and experience of) purchase service. Members are also eligible to retire at age 60 with no service requirement. The rationale for these assumptions is the 2002-2007 Experience Study.

| Sample Ages | Years of Service | % of Active Members Withdrawing within Next Year | |
|---|---|---|---|
| | | Police | Fire |
| ALL | 0 | 8.50% | 5.00% |
| | 1 | 7.50% | 4.00% |
| | 2 | 6.00% | 3.00% |
| | 3 | 5.00% | 2.00% |
| | 4 | 4.50% | 2.00% |
| 25 | 5 & Over | 4.50% | 1.96% |
| 30 | | 3.30% | 1.62% |
| 35 | | 2.30% | 1.11% |
| 40 | | 1.70% | 0.77% |
| 45 | | 1.50% | 0.60% |
| 50 | | 1.10% | 0.51% |
| 55 | | 0.80% | 0.51% |
| 60 | | 0.80% | 0.51% |
| Ref | | 566<br>207 | 230<br>113 x 0.85 |

| Sample Ages | % of Active Members Becoming Disabled within Next Year | | | |
|---|---|---|---|---|
| | Police | | Fire | |
| | Ordinary | Duty | Ordinary | Duty |
| 25 | 0.06% | 0.13% | 0.07% | 0.34% |
| 30 | 0.07% | 0.19% | 0.08% | 0.52% |
| 35 | 0.08% | 0.34% | 0.09% | 0.90% |
| 40 | 0.11% | 0.49% | 0.12% | 1.30% |
| 45 | 0.16% | 0.73% | 0.18% | 1.92% |
| 50 | 0.47% | 1.16% | 0.53% | 3.06% |
| 55 | 0.73% | 1.96% | 0.82% | 5.18% |
| 60 | 0.83% | 2.82% | 0.94% | 7.47% |
| Ref | 105 x 0.75 | 90 x 0.85 | 105 x 0.85 | 90 x 2.25 |

The rationale for these assumptions is the 2002-2007 Experience Study.

***Actuarial Accrued Liability***. The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal cost. Sometimes referred to as "accrued liability" or "past service liability."

***Accrued Service***. The service credited under the plan which was rendered before the date of the actuarial valuation.

***Actuarial Assumptions***. Estimates of future plan experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision 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 future plan benefits" between the actuarial present value of future normal cost and the Actuarial Accrued Liability. Sometimes referred to as the "actuarial funding method."

***Actuarial Equivalent***. A single amount or series of amounts of equal value to another single amount or series of amounts, computed on the basis of the rate(s) of interest and mortality tables used by the plan.

***Actuarial Present Value***. The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

***AFC.*** Average Final Compensation

***Amortization***. Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.

***ARF.*** Annuity Reserve Fund.

***ASF.*** Annuity Savings Fund.

***Contribution Budgeting Liability.*** An expected return based measure of pension obligation.

***DPOA.*** Detroit Police Officers Association

***DFFA.*** Detroit Fire Fighters Association

***DPCOA.*** Detroit Police Command Officers Association

***DROP.*** Deferred Retirement Option Program

***Experience Gain (Loss)***. A measure of the difference between actual experience and that expected based upon a set of actuarial assumptions during the period between two actuarial valuation dates, in accordance with the Actuarial Cost Method being used.

***LSA.*** Lieutenants and Sergeants Association

***Normal Cost***. The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as "current service cost." Any payment toward the Unfunded Actuarial Accrued Liability is not part of the Normal Cost.

***PAF.*** Pension Accumulation Fund.

***POA.*** The 8th Amended Plan for the Adjustment of the Debt of the City of Detroit.

***Reserve Account***. An account used to indicate that funds have been set aside for a specific purpose and are not generally available for other uses.

***Solvency Liability***. A market-based measure of the present value of accrued benefits at a municipal bond discount rate unadjusted for the credit quality of the plan sponsor.

***Unfunded Actuarial Accrued Liability***. The difference between the Actuarial Accrued Liability and Valuation Assets. Sometimes referred to as "unfunded accrued liability."

***Valuation Assets***. The value of current plan assets recognized for valuation purposes.

# The Police and Fire Retirement System of the City of Detroit

GASB Statement No. 68 Plan Reporting and Accounting Schedules of Component I

June 30, 2016

GRS Retirement Consulting
800.521.0498 | P: 248.799.9000 | F: 248.799.9020 | www.grsconsulting.com

August 31, 2017

Board of Trustees
The Police and Fire Retirement System of the City of Detroit

Dear Board Members:

This report provides information required for the Police and Fire Retirement System of the City of Detroit in connection with the Governmental Accounting Standards Board (GASB) Statement No. 68 "Employer Reporting for Pension Plans." These calculations have been made on a basis that is consistent with our understanding of this Statement. This information is subject to the System's Auditor's review. Please let us know if the System's Auditor recommends any changes. This report covers the Police and Fire Retirement System Plan known as Component I (also known as the Hybrid Plan). Since Component II is a separate plan (as defined by GASB Statement No. 67), it is detailed in a separate report.

Our calculation of the liability associated with the benefits described in this report was performed for the purpose of satisfying the requirements of GASB Statement No. 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 Statement No. 68 may produce significantly different results. This report may be provided to parties other than the System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

This report is based upon information, furnished to us by System staff, concerning retirement and ancillary benefits, active members, deferred vested members, retirees and beneficiaries, and financial data. This report is based on the valuation date of June 30, 2015. The total pension liability was rolled-forward from the valuation date to the plan year ending June 30, 2016 using generally accepted actuarial principles. The asset information as of June 30, 2016 was provided by the System. The information provided was checked for internal consistency, but it was not audited by GRS. GRS is not responsible for the accuracy of the member or financial data. GRS is not responsible for the accuracy of any information provided by the Retirement System or the plan sponsor.

At the direction of the System and with approval of the System's Auditor, the long term expected return on assets used to determine the discount rate is 7.15% net of investment expenses as of June 30, 2016, down from 7.47% net of investment expenses as of June 30, 2015. We have reviewed this assumption based on the System's asset allocation and have determined it to be reasonable for purposes of the measurement being taken.

The benefit provisions reflected in this valuation for the development of the end of year Total Pension Liability (TPL) are those in effect for Component I as of the end of the plan year on June 30, 2016. There were no changes in benefit provisions between the June 30, 2015 GASB Statement No. 68 valuation and this valuation.

To the best of our knowledge, the information contained within this report is accurate and fairly represents the actuarial position of the System on the measurement date for purposes of GASB Statement No. 68 reporting. 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 signing individuals are independent of the plan sponsor.

David T. Kausch and Judith A. Kermans are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

This report is provided to the Board, at the Board's request, for the purpose of assisting the sponsor with the plan sponsor's reporting requirements. This report includes the valuation results previously published in our GASB Statement No. 67 valuation report dated November 23, 2016. It also includes additional information/calculations required by GASB Statement No. 68. The GASB Statement No. 67 valuation results have been adjusted to reflect updated asset information. In addition, we have reflected this $20 million transfer from Component II in FY 2017 as deferred inflow.

Respectfully submitted,

David T. Kausch

David T. Kausch, FSA, EA, FCA, MAAA
Senior Consultant and Chief Actuary

Judith A. Kermans

Judith A. Kermans, EA, FCA, MAAA
Senior Consultant and President

Kenneth G. Alberts

Kenneth G. Alberts
Consultant

DTK/JAK/KGA:mrb

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# SECTION A

## EXECUTIVE SUMMARY

# Executive Summary
# as of June 30, 2016

| | | |
|---|---|---|
| Actuarial Valuation Date | | June 30, 2015 |
| Measurement Date of the Net Pension Liability | | June 30, 2016 |
| Employer's Fiscal Year Ending Date (Reporting Date) | | June 30, 2017 |
| **Membership** | | |
| Number of | | |
| - Retirees and Beneficiaries | | 67 |
| - DROP Members | | 118 |
| - Inactive, Nonretired Members | | 63 |
| - Active Members | | 2,484 |
| - Total | | 2,732 |
| Covered Payroll (excluding DROP) | $ | 131,695,469 |
| **Net Pension Liability** | | |
| Total Pension Liability | $ | 49,809,170 |
| Plan Fiduciary Net Position | | 42,283,763 |
| Net Pension Liability | $ | 7,525,407 |
| Plan Fiduciary Net Position as a Percentage of Total Pension Liability | | 84.89% |
| Net Pension Liability as a Percentage of Covered Payroll | | 5.71% |
| **Development of the Single Discount Rate** | | |
| Single Discount Rate | | 7.15% |
| Long-Term Expected Rate of Investment Return | | 7.15% |
| Long-Term Municipal Bond Rate* | | 2.85% |
| Last year ending June 30 in the 2017 to 2116 projection period for which projected benefit payments are fully funded | | 2116 |
| **Total Pension Expense** | $ | 19,875,445 |

**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 | $ - | $ 3,594,373 |
| Changes in assumptions | 2,137,038 | 783,609 |
| Net difference between projected and actual earnings on pension plan investments | 2,139,077 | - |
| Asset Transfer from Component II | - | 20,000,000 |
| Total | $ 4,276,115 | $ 24,377,982 |

*Source: *"20-Bond GO Index" is the 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. The rate shown is as of June 30, 2016, the most recent date available on or before the measurement date.*

# Discussion

## Changes from the June 30, 2016 GASB Statement No. 67 Report Issued November 23, 2016

- The Board adopted a $20 million transfer from Component II to Component I, effective in FY 2017 and in accordance with Plan provisions. This transfer is reflected in the projections demonstrating the determination of the Single Discount Rate (SDR). It is also reflected in the deferred inflow, as discussed below.
- Assets were revised after the issuance of our November 23, 2016 report. The revision related to the current balance of the voluntary member contribution accounts, which is $9,839 more than previously reported. Since the liabilities associated with the account are equal to the assets, this resulted in an increase in the TPL of $9,839, compared to the GASB Statement No. 67 report. Note, total plan assets were the same as those reported for the GASB Statement No. 67 report.

## Transfer from Component II

We understand that $20 million will be transferred out of Component II and into Component I in the 2017 fiscal year. The transfer has been reflected in the projected Net Plan Position. Based on our discussions with System staff and the auditor, we have reflected it as a deferred inflow in Component I and a deferred outflow in Component II.

## Changes to the Actuarial Assumptions

The Single Discount Rate (SDR) changed to 7.15% at the end of the year from 7.47% at the beginning of the year.

Other economic and demographic assumptions are the same as those used in the June 30, 2015 GASB Statement No. 68 valuation as approved by the Boards. Timing of pay increases was changed to beginning of year. This change relates to a change in the reported data. The prior valuation used data reported for the Component II plans. That data included the pay rate for the upcoming year. This valuation is the first one to use data specifically supplied for Component I, which includes the pay that was paid in the prior year (ending on the valuation date).

There was an administrative change in splitting of administrative expenses between Component I and Component II. Administrative expenses are now shared 50/50. This change was reflected in our modeling, where appropriate.

## Changes to the Plan Provisions

There were no changes in benefit provisions during the year affecting the Total Pension Liability.

## Funding

Employee contributions are initially set to 6.0% of pay for members hired before June 30, 2014 and 8.0% of pay for members hired after June 30, 2014, but can be increased if necessary to maintain funding levels at 100%. Employer contributions are initially set at 12.25% of payroll. Employer contributions are actuarially determined beginning in Fiscal Year 2024 to be the amount necessary to fund the plan on an actuarial basis.

## DROP Plan

We understand that the System is working on bringing the management of all DROP plan balances in-house, but that all balances are currently (as of measurement date) still managed by an outside vendor and the amount of the balances is currently unavailable. The balances were not included in the reported assets and, therefore, not included in the computed liabilities.

## Accounting Standard

For State and local government employers (as well as certain non-employers) that contribute to a Defined Benefit (DB) pension plan administered through a trust or equivalent arrangement, Governmental Accounting Standards Board (GASB) Statement No. 68 establishes standards for pension accounting and financial reporting. Under GASB Statement No. 68, the employer must 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 information is not included in this report if it is not actuarial in nature, such as the notes to the financial statements regarding accounting policies and investments. As a result, the retirement system and/or plan sponsor is responsible for preparing and disclosing the non-actuarial information needed to comply with these accounting standards.

## Financial Statements

GASB Statement No. 68 requires state and local government employers that contribute to DB pension plans to recognize the net pension liability and the pension expense on their financial statements, along with the related deferred outflows of resources and deferred inflows of resources. 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 information contained in this report does not incorporate any contributions made to the Police and Fire Retirement System of the City of Detroit subsequent to the measurement date of June 30, 2016.

## Financial Statements (Concluded)

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 certain changes in the liability and investment experience.

## Post Retirement COLA

This plan has a post retirement COLA feature known as the Variable Pension Improvement Factor or VPIF of a 1% compound COLA. It can be granted beginning July 1, 2015 only if the five-year projection shows the plan funded status above 90% based upon 6.75% future investment return. It is reasonable to assume that there will be years in which a 1% compound COLA will be granted, however, it is unlikely to be granted every year. For purposes of the TPL, we have therefore assumed a 0.50% compound COLA beginning July 1, 2016 to model the potential average COLA over time. In the notes section we indicate the TPL based on a 0% VPIF and a 1% compound VPIF beginning July 1, 2016.

## 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 of resources and inflows of resources related to pensions.

In addition, GASB Statement No. 68 requires the notes of the financial statements for the employers to include certain additional information, including:

- a description of the types of benefits provided by the plan, as well as automatic or ad hoc COLAs;
- the number and classes of employees covered by the benefit terms;
- for the current year, sources of changes in the net pension liability;
- significant assumptions and methods used to calculate the total pension liability;
- inputs to the Single Discount Rate;
- certain information about mortality assumptions and the dates of experience studies;
- the date of the valuation used to determine the total pension liability;
- information about changes of assumptions or other inputs and benefit terms;
- the basis for determining contributions to the plan, including a description of the plan's funding policy, as well as member and employer contribution requirements;
- the total pension liability, 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;
- a description of the system that administers the pension plan; and
- a description of the terms of the plan's deferred retirement option program (DROP) and the total DROP balance for those members currently participating in the DROP. ***Current DROP balances for members of this plan are not available and are not included. These balances are also excluded from the reported assets.***

## Required Supplementary Information

The financial statements of employers also include required supplementary information showing the 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 actual employer contributions to the actuarially determined contributions based on the plan's funding policy.

While the first two tables may be built prospectively as the information becomes available, sufficient information may currently be available for the third table from prior financial statements.

## Timing of the Valuation

An actuarial valuation to determine the total pension liability is required to be performed at least every two years. For the employer's financial reporting purposes, the net pension liability and pension expense should be measured as of the employer's "measurement date" which may not be earlier than the employer's prior fiscal year-end date. 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 June 30, 2015 rolled to the plan year end of June 30, 2016.

## 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 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 7.15%; the municipal bond rate is 2.85% (based on the "20-Bond GO Index" from the Bond Buyer Index); and the resulting Single Discount Rate is 7.15% as of June 30, 2016.

For purposes of calculating the SDR, the following simplifications were made to the projections:

1) Voluntary employee contributions were excluded.
2) The VPIF was assumed to be 0.50% compound each year beginning in Fiscal Year 2017.
3) Mandatory employee contributions were assumed to be fixed at the current rate of 6%.
4) The VPIF reduction under Section 9.5 of the plan was assumed not to occur.
5) Employer contributions were determined in a manner to fully fund the plan beginning in 2024, in accordance with the plan.

## Limitation of Assets as a Percent of Total Pension Liability Measurements

This report includes a measure of the plan fiduciary net position as a percent of total pension liability (84.89% as of June 30, 2016). Unless otherwise indicated, with regard to any such measurements presented in this report:

(1) This measurement is not intended to be a funded ratio or a measure of funded progress.
(2) This measurement is inappropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan's benefit obligations.
(3) The measurement is inappropriate for assessing the need for or amount of future employer contributions.

## Limitations of Project Scope

Actuarial Standards do not require the actuary to evaluate the ability of the Plan sponsor or other contributing entities to make required contributions when due. Such an evaluation was not within the scope of this project and is not within our area of expertise. Consequently, we have not made such an evaluation.

## Plan

The Police and Fire Retirement System has two components. It is our understanding that Component I and Component II are separate plans and that the assets from one plan cannot be used to satisfy the liabilities of the other, even though assets may be pooled for investment purposes. Therefore, this report only includes the liabilities and reported assets of Component I. The liabilities and reported assets of Component II are detailed in a separate report.

## Data

When the member data was submitted for this valuation, there were no reported retirees or deferred members. Data for this plan was submitted from a different source than the data submitted for Component II. After reconciling the data between the two plans and meeting with System staff to get answers to data reconciliation questions, we were able to create a data set for retired and deferred members with estimated benefits.

# SECTION B

## FINANCIAL STATEMENTS

This information is subject to the System's Auditor's review.  Please let us know if the System's Auditor recommends any changes.

# Statement of Fiduciary Net Position
# as of June 30, 2016

| | |
|---|---|
| **Assets** | |
| Cash and Deposits | N/A |
| Receivables | |
| Accounts Receivable - Sale of Investments | N/A |
| Accrued Interest and Other Dividends | N/A |
| Contributions | N/A |
| Accounts Receivable - Other | N/A |
| Total Receivables | N/A |
| Investments | |
| Fixed Income | N/A |
| Domestic Equities | N/A |
| International Equities | N/A |
| Real Estate | N/A |
| Other | N/A |
| Total Investments | N/A |
| **Total Assets** | $ 46,238,687 |
| **Liabilities** | |
| Payables | |
| Accounts Payable | $ 3,954,924 |
| **Total Liabilities** | $ 3,954,924 |
| **Total Fund Balances** | $ 42,283,763 |

A breakdown of the assets by investment class was not provided. Note that the $20 million transfer from Component II made after the end of the year is not reflected in the June 30, 2016 fiduciary net position, but is included as a deferred inflow.

# Statement of Changes in Fiduciary Net Position for Year Ended June 30, 2016

| | | |
|---|---|---|
| **Additions** | | |
| Contributions | | |
| Employer | $ | 15,955,915 |
| Mandatory Member Pension Fund Contributions | | 7,834,119 |
| Voluntary Member Contributions | | 15,459 |
| Total Contributions | $ | 23,805,493 |
| Investment Income | | |
| Net Appreciation in Fair Value of Investments | $ | 252,125 |
| Investment Income | | - |
| Less Investment Expense | | - |
| Net Investment Income | $ | 252,125 |
| Other | $ | 301 |
| **Total Additions** | $ | 24,057,919 |
| **Deductions** | | |
| Benefit Payments, including Refunds of Employee Contributions | $ | 101,251 |
| Pension Plan Administrative Expense | | 3,000,369 |
| Other | | - |
| **Total Deductions** | $ | 3,101,620 |
| **Net Increase in Net Position** | $ | 20,956,299 |
| Total Fund Balances Beginning of Year | $ | 21,327,464 |
| Total Fund Balances End of Year | $ | 42,283,763 |

# Pension Expense Under GASB Statement No. 68
# Fiscal Year Ended June 30, 2016

| | | |
|---|---|---|
| **A. Expense** | | |
| 1. Service Cost * | $ | 24,084,267 |
| 2. Interest on the Total Pension Liability | | 2,743,066 |
| 3. Current-Period Benefit Changes | | - |
| 4. Employee Contributions (made negative for addition here)* | | (7,849,578) |
| 5. Projected Earnings on Plan Investments (made negative for addition here) | | (2,366,462) |
| 6. Pension Plan Administrative Expense | | 3,000,369 |
| 7. Other Changes in Plan Fiduciary Net Position | | (301) |
| 8. Recognition of Outflow (Inflow) of Resources due to Liabilities | | (307,986) |
| 9. Recognition of Outflow (Inflow) of Resources due to Assets | | 572,070 |
| **10. Total Pension Expense** | **$** | **19,875,445** |

* *Voluntary employee contributions made during the year are added to the service cost and included in the employee contribution total.*

# Statement of Outflows and Inflows Arising from Current Reporting Period Fiscal Year Ended June 30, 2016

**A. Outflows (Inflows) of Resources due to Liabilities**

| | | |
|---|---|---|
| 1. Difference between expected and actual experience of the Total Pension Liability (gains) or losses | $ | (4,077,124) |
| 2. Assumption Changes (gains) or losses | $ | 2,424,058 |
| 3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years} | | 8.4456 |
| 4. Outflow (Inflow) of Resources to be recognized in the current pension expense for the difference between expected and actual experience of the Total Pension Liability | $ | (482,751) |
| 5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes | $ | 287,020 |
| 6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities | $ | (195,731) |
| 7. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for the difference between expected and actual experience of the Total Pension Liability | $ | (3,594,373) |
| 8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes | $ | 2,137,038 |
| 9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities | $ | (1,457,335) |

**B. Outflows (Inflows) of Resources due to Assets**

| | | |
|---|---|---|
| 1. Net difference between projected and actual earnings on pension plan investments (gains) or losses | $ | 2,114,337 |
| 2. Recognition period for Assets {in years} | | 5.0000 |
| 3. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Assets | $ | 422,867 |
| 4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets | $ | 1,691,470 |

# Statement of Outflows and Inflows Arising from Current and Prior Reporting Periods Fiscal Year Ended June 30

**A. Outflows and Inflows of Resources due to Liabilities and Assets to be Recognized in Current Pension Expense**

| | Outflows of Resources | Inflows of Resources | Net Outflows of Resources |
|---|---|---|---|
| 1. Due to Liabilities | $ 287,020 | $ 595,006 | $ (307,986) |
| 2. Due to Assets | 572,070 | - | 572,070 |
| **3. Total** | $ 859,090 | $ 595,006 | $ 264,084 |

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

| | Outflows of Resources | Inflows of Resources | Net Outflows of Resources |
|---|---|---|---|
| 1. Differences between expected and actual experience | $ - | $ 482,751 | $ (482,751) |
| 2. Assumption Changes | 287,020 | 112,255 | 174,765 |
| 3. Net Difference between projected and actual earnings on pension plan investments | 572,070 | - | 572,070 |
| **4. Total** | $ 859,090 | $ 595,006 | $ 264,084 |

**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 of Resources |
|---|---|---|---|
| 1. Differences between expected and actual experience | $ - | $ 3,594,373 | $ (3,594,373) |
| 2. Assumption Changes | 2,137,038 | 783,609 | 1,353,429 |
| 3. Net Difference between projected and actual earnings on pension plan investments | 2,139,077 | - | 2,139,077 |
| 4. Asset Transfer | - | 20,000,000 | (20,000,000) |
| **5. Total** | $ 4,276,115 | $ 24,377,982 | $ (20,101,867) |

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

| Year Ending June 30 | Net Deferred Outflows of Resources |
|---|---|
| 2017 | $ (19,735,916) |
| 2018 | 264,084 |
| 2019 | 264,082 |
| 2020 | 114,883 |
| 2021 | (307,986) |
| Thereafter | (701,014) |
| **Total** | $ (20,101,867) |

# Schedule of Changes in Net Pension Liability and Related Ratios
# Current Period
# Fiscal Year Ended June 30, 2016

| | | |
|---|---|---|
| **A. Total pension liability** | | |
| 1. Service cost * | $ | 24,084,267 |
| 2. Interest on the total pension liability | | 2,743,066 |
| 3. Changes of benefit terms | | 0 |
| 4. Difference between expected and actual experience of the total pension liability | | (4,077,124) |
| 5. Changes of assumptions | | 2,424,058 |
| 6. Benefit payments, including refunds of employee contributions | | (101,251) |
| 7. Net change in total pension liability | $ | 25,073,016 |
| 8. Total pension liability – beginning | | 24,736,154 |
| 9. Total pension liability – ending | **$** | **49,809,170** |
| **B. Plan fiduciary net position** | | |
| 1. Contributions – employer | $ | 15,955,915 |
| 2. Contributions – employee * | | 7,849,578 |
| 3. Net investment income | | 252,125 |
| 4. Benefit payments, including refunds of employee contributions | | (101,251) |
| 5. Pension plan administrative expense | | (3,000,369) |
| 6. Other | | 301 |
| 7. Net change in plan fiduciary net position | $ | 20,956,299 |
| 8. Plan fiduciary net position – beginning | | 21,327,464 |
| 9. Plan fiduciary net position – ending | **$** | **42,283,763** |
| **C. Net pension liability** | **$** | **7,525,407** |
| **D. Plan fiduciary net position as a percentage of the total pension liability** | | **84.89%** |
| **E. Covered-employee payroll** | **$** | **131,695,469** |
| **F. Net pension liability as a percentage of covered-employee payroll** | | **5.71%** |

A Special Funding Situation may occur if a non-city entity has a legal obligation to contribute directly to the Retirement System. The Net Pension Liability shown here has not been adjusted for any potential special funding situation.

* *Voluntary employee contributions made during the year are added to the service cost and included in the employee contribution total. Figures shown differ from those corresponding to the GASB Statement No. 67 report due to the updated reported Voluntary Employee Contributions.*

# Schedules of Required Supplementary Information
# Schedule of Changes in Net Pension Liability and Related Ratios
# Multiyear

## Ultimately 10 Fiscal Years will be Displayed

| Fiscal year ending June 30, | 2016 | 2015 |
|---|---|---|
| **Total Pension Liability** | | |
| Service Cost# | $ 24,084,267 | $ 24,850,184 |
| Interest on the Total Pension Liability (and Service Cost) | 2,743,066 | 894,089 |
| Benefit Changes | - | - |
| Difference between Expected and Actual Experience | (4,077,124) | - |
| Assumption Changes | 2,424,058 | (1,008,119) |
| Benefit Payments | (63,883) | - |
| Refunds | (37,368) | - |
| **Net Change in Total Pension Liability** | 25,073,016 | 24,736,154 |
| **Total Pension Liability - Beginning** | 24,736,154 | - |
| **Total Pension Liability - Ending (a)** | $ 49,809,170 | $ 24,736,154 |
| **Plan Fiduciary Net Position** | | |
| Employer Contributions | $ 15,955,915 | $ 14,606,971 |
| Employee Contributions# | 7,849,578 | 7,404,705 |
| Pension Plan Net Investment Income | 252,125 | 21,019 |
| Benefit Payments | (63,883) | (19,554) |
| Refunds | (37,368) | - |
| Pension Plan Administrative Expense | (3,000,369) | (685,677) |
| Other | 301 | - |
| **Net Change in Plan Fiduciary Net Position** | 20,956,299 | 21,327,464 |
| **Plan Fiduciary Net Position - Beginning** | 21,327,464 | - |
| **Plan Fiduciary Net Position - Ending (b)** | $ 42,283,763 | $ 21,327,464 |
| **Net Pension Liability - Ending (a) - (b)** | 7,525,407 | 3,408,690 |
| **Plan Fiduciary Net Position as a Percentage of Total Pension Liability** | 84.89 % | 86.22 % |
| **Covered-Employee Payroll (excluding DROP)** | $ 131,695,469 | $ 132,566,687 |
| **Net Pension Liability as a Percentage of Covered-Employee Payroll** | 5.71 % | 2.57 % |

**Notes to Schedule:**

N/A

A Special Funding Situation may occur if a non-city entity has a legal obligation to contribute directly to the Retirement System. The Net Pension Liability shown here has not been adjusted for any potential special funding situation.

# *Voluntary employee contributions made during the year are added to the service cost and included in the employee contribution total.*

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

### Ultimately 10 Fiscal Years will be Displayed

| FY Ending June 30, | 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 |
|---|---|---|---|---|---|---|
| 2015 | $ 24,736,154 | $ 21,327,464 | $ 3,408,690 | 86.22% | $ 132,566,687 | 2.57% |
| 2016 | $ 49,809,170 | $ 42,283,763 | $ 7,525,407 | 84.89% | $ 131,695,469 | 5.71% |

* *Covered payroll shown is the reported payroll from the actuarial valuation date (census date). For 2015, covered payroll was based on payroll reported for Component II. For 2016, covered payroll was based on payroll reported for Component I.*

# Schedule of Contributions Multiyear

## Last 10 Fiscal Years

| FY Ending June 30, | Actuarially Determined Contribution# | Actual Contribution | Contribution Deficiency (Excess) | Covered Payroll* | Actual Contribution as a % of Covered Payroll |
|---|---|---|---|---|---|
| 2015 | N/A | $ 14,606,971 | N/A | $ 132,566,687 | 11.02% |
| 2016 | N/A | $ 15,955,915 | N/A | $ 131,695,469 | 12.12% |

* *Covered payroll shown is the reported payroll from the actuarial valuation date (census date). For 2015, covered payroll was based on payroll reported for Component II. For 2016, covered payroll was based on payroll reported for Component I.*

\# *Employer contribution amounts are set in the plan until Fiscal Year 2024.*

# Notes to Schedule of Contributions

**Employer Contribution:** 12.25% until FY 2024. Actuarially determined beginning in FY 2024.

## Schedule of Investment Returns

This information was not available to Gabriel, Roeder, Smith & Company for this report.

## Rate Stabilization Fund (RSF)

The RSF, as defined in Section 9.2(4) of the combined Plan document, is currently $0.

## Single Discount Rate

A Single Discount Rate of 7.15% was used to measure the total pension liability as of June 30, 2016. This Single Discount Rate was based on the expected rate of return on pension plan investments of 7.15% as directed by the System and the System's Auditor. The projection of cash flows used to determine this Single Discount Rate assumed that plan member contributions will be made at 6% of compensation for members hired before June 30, 2014 and 8% for members hired after June 30, 2014 and that employer contributions will be made at 12.25% of compensation through June 30, 2023.

Beyond 2023, the employer contributions will be actuarially determined, however, the Board does not have a funding policy at this time. For purposes of the GASB projections only, the employer contribution shown in this report is the rate which, when applied to the closed group payroll, is sufficient to fund the benefits. It was further assumed that an additional $20 million would be contributed in the 2017 fiscal year. The rate as determined is 13.82% of the closed group payroll. The actual contributions to this plan will be on open group payroll under different assumptions and methods and are expected to be at a lower rate. The distortion caused by the required GASB projection should not be interpreted as a funding recommendation or requirement.

Based on these assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

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% | Current Single Discount Rate Assumption 7.15% | 1% Increase 8.15% |
|---|---|---|---|
| Total Pension Liability (TPL) | $58,585,907 | $49,809,170 | $42,836,809 |
| Net Position Restricted for Pensions | 42,283,763 | 42,283,763 | 42,283,763 |
| Net Pension Liability (NPL) | $16,302,144 | $ 7,525,407 | $ 553,046 |

## Expected Real Returns by Asset Class

This information was not available to Gabriel, Roeder, Smith & Company for this report.

## Summary of Population Statistics

| | |
|---|---|
| Inactive Plan Members or Beneficiaries Currently Receiving Benefits | 67 |
| DROP Members | 118 |
| Inactive Plan Members Entitled to But Not Yet Receiving Benefits | 63 |
| Active Plan Members | 2,484 |
| Total Plan Members | 2,732 |

## Additional Notes

Liabilities and reported assets for Component II are not included in this report and will be detailed in a separate report.

The Total Pension Liability is sensitive to the assumption regarding the VPIF. The current assumption is 0.5%. The sensitivity may increase as the plan matures. To illustrate the sensitivity, we are showing the Total Pension Liability below based on two alternate VPIF assumptions: 0% and 1% beginning July 1, 2015 (the maximum amount payable). All scenarios are based on a 7.15% discount rate.

### VPIF Assumption

| | Minimum 0% | Current Assumption 0.5% | Maximum 1% |
|---|---|---|---|
| Total Pension Liability (TPL) | $47,313,617 | $49,809,170 | $52,529,388 |
| Net Position Restricted for Pensions | 42,283,763 | 42,283,763 | 42,283,763 |
| Net Pension Liability (NPL) | $ 5,029,854 | $ 7,525,407 | $10,245,625 |

# SECTION C

## SUMMARY OF BENEFITS

# Summary of Benefit Provisions
# (July 1, 2015)

## *Plan Year*

***The Plan Year*** is the 12-month period commencing on July 1, and ending on June 30. The first plan year starts July 1, 2014.

## *Plan Membership*

***Employee*** means an employee of the City's Police Department who has taken an oath of office or a Firefighter providing services to the City, excluding individuals who are compensated on a contractual or fee basis, any person who is classified as a non-common law employee or an independent contractor for federal income tax and withholding, and also excluding the Medical Director of the Retirement System.

***The membership*** of the Retirement System shall consist of all employees of the Fire Department of the City of Detroit and of the Police Department of the City of Detroit who are employed as Firefighters or Police Officers according to the rules and regulations of the respective departments.

**Appointed Officials** of the Police Department or the Fire Department who are appointed from the membership are permitted to remain members. A Police Officer or Firefighter who is **killed or totally disabled prior to being confirmed**, shall be deemed to have been a member as of the date of his or her death. Any Member who is **transferred to a civilian position** in his or her department shall continue as a member.

## *Service Credit*

***Credited Service:*** A member is credited with one month of Credited Service for each calendar month in which the individual performs 140 hours or more of service for the employer as a member. Credited Service is recorded from the later of July 1, 2014, or the date of employment with the City as a Police Officer or Firefighter. A member also receives 1 month of Credited Service for each month the member is eligible to receive duty disability benefits, until such time as the member has 25 years of credited service.

***Prior Service:*** refers to service credit awarded to a member prior to July 1, 2014 under the terms of the Retirement System in effect on June 30, 2014.

***Vesting Service:*** A member is credited with a year of vesting service for each Plan Year commencing on or after July 1, 2014 during which the member performs 1,000 or more hours of work for the employer. Prior Service, as defined above, is also Vesting Service.

***Military Service:*** A member who enters the military while employed by the City and returns to employment with the City following military service receives service credit in the Retirement System for the military service time as though there had been no interruption of employment. In order to receive such service credit, the individual must pay contributions to the Retirement System for the military service time upon return to employment.

# Summary of Benefit Provisions
# (Continued)

## *Average Final Compensation*

***Compensation:*** Compensation is base salary, excluding bonuses, overtime, sick leave, longevity pay, unused vacation time, etc. Compensation includes deferred compensation and "picked up" employee contributions to the Retirement System. Compensation is limited by IRC Section 401(a)(17).

***Average Final Compensation:*** The average of the compensation received during the 5 consecutive years of Credited Service (including Prior Service) immediately preceding the date of the members last termination of City employment as a Police Officer or Firefighter. If the member has less than 5 years of Credited Service (including Prior Service), the Average Final Compensation is the average of the compensation received during all years of Credited Service.

***Final Compensation*** means the annual compensation of a member at the time of last termination of employment.

## *Normal Retirement*

***Normal Retirement Age:*** The Normal Retirement Age is 50 with 25 or more years of Credited Service (including prior service), with the following transition period.

| Fiscal Year | Age and Elgibility Service |
|---|---|
| 2015 | 43 and 20 |
| 2016 | 43 and 20 |
| 2017 | 44 and 21 |
| 2018 | 45 and 22 |
| 2019 | 46 and 23 |
| 2020 | 47 and 24 |
| 2021 and later | 50 and 25 |

***Normal Retirement Amount:*** The retirement allowance payable to a member who retires on or after the normal retirement age is 2.0% times average final compensation times Credited Service (after June 30, 2014) measured to the nearest month.

## *Deferred Retirement (Vested Benefit)*

***Eligibility:*** 10 years of Vesting Service.

***Benefit Commencement:*** Age 55.

***Annual Amount:*** Same as Normal Retirement but based on Average Final Compensation and Credited Service at the time of termination. An actuarial reduction from age 62 is applicable if benefits are taken prior to age 62 (*waived for DPLSA and DPCOA members*).

# Summary of Benefit Provisions
# (Continued)

### *Duty Disability Retirement*

***Eligibility:*** The individual must be totally disabled for duty by reason of illness, injury, or disease resulting from performance of duty.

***Amount:*** For the first 24 months, the member shall receive a basic benefit equal to 50% of his or her final compensation plus a supplemental benefit equal to 16-2/3 % of final compensation. After 24 months, if the Board finds that the member is disabled from any occupation the member shall continue to receive both the 50% and the 16-2/3% benefit until the member would have achieved 25 years of service. The 16-2/3% benefit ceases at the time the member would have had 25 years of service, or if the member is found not to be disabled from any occupation after the 24 month review. Duty disability benefits continue to be paid until age 65, unless the member is found not to be disabled prior to that date. Upon termination of disability, or the attainment of age 65, the member's benefit is reduced to the 50% basic benefit. Earned Income in any year acts to reduce the disability benefit in the following year, to the extent that earned income combined with the disability benefit exceeds the compensation at the time of disability (after adjustment for the Variable Improvement factor). Amounts payable from Worker's Comp or similar programs are offset against the amount otherwise payable.

### *Non-Duty Disability Retirement*

***Eligibility:*** Total and permanent disability that is not duty related but that occurred while in the employ of the City.

***Amount:*** If the member has less than 5 years of Credited service, accumulated contributions are refunded or, at the members option, may be payable in the form of a cash refund annuity. No other benefits are payable. Members with 5 or more years of credited service at the time of disability may receive a benefit computed as a Normal Retirement benefit, but not less than 20% of Average Final Compensation. Earned Income in any year acts to reduce the disability benefit in the following year, to the extent that earned income combined with the disability benefit (after adjustment for the Variable Improvement factor) exceeds the compensation at the time of disability. Amounts payable from Worker's Comp or similar programs are offset against the amount otherwise payable.

# Summary of Benefit Provisions
# (Continued)

## *Accidental (Line of Duty) Death Before Retirement*

***Eligibility:*** Death resulting directly from performance of Duty in the service of the employer or as a result of illness contracted or injuries received while in the service of the employer.

***Amount:*** Accumulated Mandatory Employee Contributions are refunded. If there is a surviving spouse, the surviving spouse receives a lifetime pension of 5/11ths of the member's final compensation. Each surviving child under age 18 receives a pension of $1/10^{th}$ of final compensation payable until age 18. If there are more than two surviving children, each receives an equal share of 7/33rds of final compensation, payable to age 18 and redistributed to the remaining children upon attainment of age 18. The sum of all benefits payable shall not exceed 1/3rd of the member's Final Compensation. If there is no surviving spouse, each surviving child under age 18 receives a pension of $1/4^{th}$ of the member's final compensation, subject to a maximum total of ½ of final compensation. If there is neither surviving spouse nor surviving children under the age of 18, each dependent parent, if any, shall receive a pension of $1/6^{th}$ of the member's Final Compensation.

## *Ordinary (Other than Line of Duty) Death Before Retirement*

***Eligibility:*** 10 or more years of Vesting Service. The individual must be employed by the employer at time of death.

***Amount:*** The Surviving Spouse shall receive a retirement allowance computed as though the member had retired the day before death, notwithstanding that the death was prior to the Normal Retirement Date, elected the Joint and 100% Option in favor of the spouse, and then died.

## *Refund of Mandatory Contributions*

A member who ceases to be an employee for reasons other than retirement, death, or disability, may elect to receive a refund of mandatory Accumulated Contributions (without interest) in lieu of any other Component I benefit payable. In the case of a member who dies while employed by the City, or following termination of employment with the City, if no Surviving Spouse benefit is payable, the accumulated mandatory Employee Contributions (without interest) are paid to the member's estate.

## *Variable Pension Improvement Factor (VPIF Escalator)*

***Eligibility:*** In receipt of a retirement allowance for at least 12 months as of the first day of the plan year.

***Amount:*** Beginning July 1, 2015 and effective the first date of each Plan year thereafter, the Board may determine that the Component I Retirement Allowance shall be increased by 1% of the then current (i.e., compounded to include prior VPIF's) retirement allowance. The VPIF Escalator may not be awarded in the event that the funding level of Component I of the Retirement System projected over a 5-year period falls below 90%.

# Summary of Benefit Provisions
# (Continued)

### *Deferred Retirement Option Program "DROP"*

***Eligibility:*** Eligible for immediate retirement under Component I and either a non-union executive or covered by a collective bargaining agreement permitting participation in the DROP.

***Amount:*** Upon entry into the DROP, the member ceases to accrue additional retirement benefits and must elect the optional form under which the retirement allowance will ultimately be paid. 75% of that amount, including VPIF, is paid into the DROP account.

***Investment:*** ING is currently responsible for the administration and investment of the DROP accounts. As soon as possible after July 1, 2014, the Board shall determine whether or not it is feasible for the Board to administer and invest the DROP accounts, in which case DROP assets would be commingled with Retirement System assets for investment purposes.

***Earnings Credits:*** If the Board administers and invests the accounts, earnings credits shall be 75% of actual net Retirement System earnings rates, but neither less than 0% nor more than 7.75%.

***Fees:*** Fees associated with maintenance of the DROP accounts outside the Retirement System shall be charged directly to DROP participants by means of deductions from their accounts.

***Distribution:*** Upon termination of employment for any reason (including disability), the member's DROP account may be distributed in the form of a lump sum or an annuity. Any such annuity shall be subject to market rates of interest and other market related assumptions. At the same time, the member's monthly retirement allowance shall commence in the amount that would have been paid at the time the member entered the DROP, together with any applicable VPIF increases.

***Death While in DROP:*** In the case of a member who dies during DROP participation, the DROP account balance is paid either to the named beneficiary or to the estate. Further, the DROP election is then rescinded and 100% of the retirement allowance that would have been paid but for participation in the DROP is restored. Survivor benefits are then payable in accordance with the payment option elected by the deceased member at the time the member elected to participate in the DROP.

***Termination of DROP:*** The DROP can be terminated if it is determined that it is not cost neutral and cannot be amended to make it so.

### *Contributions*

***Members:*** Members who were active as of June 30, 2014 contribute 6% of Compensation. Members who are hired or rehired after that date contribute 8% of compensation. DROP participants do not make employee contributions. Member contributions are "picked up" in accordance with IRC 414(h).

***Employers:*** 11.2% of compensation for members of the DPOA until October 3, 2014; 11.2% of Compensation of active employees who are members of the DFFA until November 6, 2014; 12.25% of Compensation of Active employees who are members of the DPCOA, DPLSA, and DPOA from and after October 3, 2014 until June 30, 2023; 12.25% of Compensation of DFFA members from and after November 6, 2014 until June 30, 2023, to be split between the Pension Accumulation Fund and the Rate Stabilization reserve. For Plan years 2024 and later, contributions shall be determined by an Actuary using reasonable and appropriate assumptions approved by the Board and the Investment Committee.

# Summary of Benefit Provisions
# (Continued)

## *Voluntary Employee Contributions*

***Eligibility:*** Coverage by a collective bargaining agreement that permits the Member to make Voluntary Employee Contributions to Component I. Cannot be a current participant in the DROP.

***Amount:*** Not less than 1% of Compensation nor more than 10% of Compensation. DPOA members can elect to have a whole % of the amount the City pays him or her for accumulated sick leave in excess of 400 hours paid to the voluntary employee account. All voluntary employee contributions are made on an after tax basis.

***Earnings Crediting:*** Each Plan year, accounts are credited with earnings at a rate equal to the net investment rate of return on Retirement System Assets for the second fiscal year immediately preceding the fiscal year in which earnings are to be credited. The earnings rate may not be less than 0% and may not exceed 5.25%.

***Distribution:*** Upon termination of employment, accounts may be distributed in a lump sum, in equal monthly installments for a period not exceeding three years, or, at the option of the member, in the form of an actuarially equivalent life annuity payable in the same form as and added to the member's Retirement Allowance. The determination of actuarial equivalent for this purpose is based upon market rates of investment return and other market related assumptions. In case of a member who dies before receiving a distribution of his or her voluntary account, the value of the account is payable to the nominated beneficiary, or to the estate.

## *Forms of Payment*

***Normal Form of Payment:*** The normal form of payment is a straight life allowance with no death benefit, and, in particular, no residual refund of mandatory employee contributions. Until the date the first Retirement Allowance payment check is issued, any Member may elect to receive payment in either the Normal Form or in the Actuarial Equivalent of the Normal Form computed as of the effective date of retirement and payable in one of the forms described below.

***Option One. Modified Cash Refund Annuity:*** If a Retiree who elected a Modified Cash Refund Annuity dies before payment has been received in an aggregate amount equal to, but not exceeding the Retiree's Accumulated Mandatory Employee Contributions at the time of retirement, the difference between said Accumulated Mandatory Employee Contributions and the aggregate amount of annuity payments already received, shall be paid in a single lump sum to a Beneficiary nominated by written designation duly executed by the Member and filed with the Board. If there are no such designated Beneficiaries surviving said Retiree, any such difference shall be paid to the Retiree's estate.

***Option Two. Joint and One Hundred Percent Survivor Allowance:*** Upon the death of a Retiree who elected a Joint and One Hundred Percent Survivor Allowance, one hundred percent of the reduced Retirement Allowance shall be paid to and continued throughout the life of the Beneficiary nominated by written designation duly executed and filed with the Board prior to the date the first payment of the Retirement Allowance becomes due.

# Summary of Benefit Provisions
# (Continued)

***Option "A". Joint and Seventy-Five Percent Survivor Allowance:*** Upon the death of a Retiree who elected a Joint and Seventy-Five Percent Survivor Allowance, seventy-five percent of the reduced Retirement Allowance shall be continued throughout the life of and paid to the Beneficiary nominated by written designation duly executed by the Member and filed with the Board prior to the date the first payment of the Retirement Allowance becomes due.

***Option Three. Joint and Fifty Percent Survivor Allowance:*** Upon the death of a Retiree who elected a Joint and Fifty Percent Survivor Allowance, fifty percent of the reduced Retirement Allowance shall be continued throughout the life of and paid to the Beneficiary nominated by written designation duly executed by the Member and filed with the Board prior to the date the first payment of the Retirement Allowance becomes due.

***Option "B". Joint and Twenty-Five Percent Survivor Allowance:*** Upon the death of a Retiree who elected a Joint and Twenty-Five Percent Survivor Allowance, twenty-five percent of the reduced Retirement Allowance shall be paid throughout the life of the Beneficiary nominated by written designation duly executed and filed with the Board prior to the date the first payment of the Retirement Allowance becomes due.

***Joint and Survivor Optional Forms of Payment:*** The Joint and Survivor Optional Forms of Payment provided under the Retirement System shall be made available in either the standard form or the pop-up form, as follows:

> ***Standard Form:*** Under the Standard Form, the reduced Retirement Allowance shall be paid throughout the lifetime of the Retiree.
>
> ***Pop-up Form:*** Under the Pop-up Form, the reduced Retirement Allowance shall be paid throughout the lifetime of the Retiree and the designated Beneficiary. In the event of the death of the designated Beneficiary during the lifetime of the Retiree, the amount of the Retirement Allowance shall be changed to the amount that would have been payable had the Retiree elected the Straight Life Retirement Allowance Form of Payment.

***Disposition of Residue:*** If under a Joint and One Hundred Percent Survivor allowance, a Joint and Seventy-Five Percent Survivor allowance, a Joint and Fifty Percent Survivor allowance, or a Joint and Twenty-Five Percent Survivor allowance as provided above, both the Retiree and the Beneficiary die before they have received, in Retirement Allowance payments, an aggregate amount equal to the Retiree's Accumulated Mandatory Employee Contributions at the time of retirement, the difference between the said Accumulated Mandatory Employee Contributions and the aggregate amount of Retirement Allowances paid to the Retiree and Beneficiary, shall be paid in a single lump sum to such person or persons nominated by written designation of the Retiree duly executed and filed with the Board. If there are no such person or persons surviving the Retiree and the Beneficiary, any such difference shall be paid to the estate of the second to die of the Retiree or Beneficiary.

# Summary of Benefit Provisions
# (Concluded)

### *Rehire Before or After Retirement*

**A former member who is vested** and is not a DROP participant and who later becomes a Police Officer or Firefighter (but not a Police Assistant) shall have his or her benefit pertaining to total Credited Service earned on and after July 1, 2014 calculated in accordance with the terms of Component I of the Retirement System in effect at the time of the last separation from service. If the former member has previously withdrawn mandatory accumulated contributions, and such withdrawn contributions are not repaid within two years of the rehire date, only the Credited Service earned on and after the rehire date shall be taken into consideration in determining the retirement allowance.

**Retirement benefits for a Retiree who returns to active full time employment** other than as a Police Assistant shall be subject to the following provisions:

- A Retiree who returns to work will have the Retirement Allowance suspended upon re-employment. The variable pension improvement factor (escalator) shall not be added to the amount of the original Retirement Allowance during the Retiree's re-employment period.
- A Retiree who returns to work will be entitled to receive a second Retirement Allowance in accordance with the provisions of the Retirement System in effect during the re-employment period.
- A Retiree's Average Final Compensation for purposes of determining the second Retirement Allowance will be based upon the Compensation earned by the Retiree after the return to work.

An individual who retires for a second time will not be allowed to change the payment option selected with respect to the original Retirement Allowance. However, the individual may select a separate payment option with respect to the second Retirement Allowance.

# SECTION D

## ACTUARIAL COST METHOD AND ACTUARIAL ASSUMPTIONS

# Summary of Assumptions and Methods
# Used for GASB Valuation

**All demographic assumptions are estimates of future experience except as noted. The rationale for the assumptions is based on the 2002-2007 experience study of the Component II plan unless noted otherwise.**

## Economic Assumptions

***For the Determination of the June 30, 2015 TPL:***
*The investment return rate* used in the valuation was 7.15% per year, compounded annually (net after expenses). This is a prescribed assumption set by the Retirement System. We believe it is reasonable when using a 2.25% assumed **price inflation**.

**Pay increase assumptions** for individual active members are shown on page 28. Part of the assumption for each age is for a merit and/or seniority increase, and the other recognizes wage inflation (as of June 30, 2014 assumed to be 2.00% for five years, 2.50% for the next five years after that and 3.00% thereafter). The rationale for this assumption is that it is consistent with expectations by the employer used during the plan design.

## Non-Economic Assumptions

***The mortality table*** used to measure retired life mortality is the RP-2014 Blue Collar Annuitant Table for males and females. Tables were extended below age 50 with a cubic spline to the published Juvenile rates. Pre-retirement mortality is the RP-2014 Blue Collar Employee Tables for males and females. The tables are projected to be fully generational, based on the 2-dimensional, sex distinct mortality improvement scale MP-2014 (which was published and intended to be used with RP-2014). The rationale for the mortality assumption is based on the 2008-2013 Mortality Experience Study issued February 13, 2015.

***The probabilities of age/service retirement*** for members eligible to retire are shown on pages 29 and 30. The rationale is based on the 2002-2007 Experience Study modified as necessary to account for the difference in eligibility of the Component I plan.

***The probabilities of separation*** from service are shown for sample ages on page 31.

# Funding Methods

***The entry age actuarial cost method*** was used in determining age and service liabilities and normal cost, vesting liabilities and normal cost, and casualty liabilities and normal cost. Under this method, each individual's normal cost is determined as a level percent of pay from plan entry to retirement. Plan entry is the later of date of hire or plan effective date. Retirement is the earlier of DROP or termination of active service. This method is used in this report to comply with the GASB Standards and may differ from the method used for funding the plan.

***Unfunded Actuarial Accrued Liabilities.*** Actual employer contributions through June 30, 2023 are set at 12.25% of compensation. The amortization period and method after 2023 has not yet been established by the Board. For the purposes of the GASB projections only, the employer contribution shown in this report is the rate which, when applied to the closed group projected payroll, is sufficient to fund the benefits.

***Present assets*** are set equal to the Market Value.

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***The data about persons now covered and about present assets*** was furnished by the System's administrative staff. Although examined for general reasonableness, the data was not audited by the actuary.

# Sample Salary Adjustment Rates

| Service | Salary Increase Assumptions for an Individual Member | | |
|---|---|---|---|
| | Merit & Seniority | Base (Economic) | Increase Next Year |
| 5 | 5.20% | 3.00% | 8.20% |
| 10 | 1.70% | 3.00% | 4.70% |
| 15 | 1.00% | 3.00% | 4.00% |
| 20 | 1.00% | 3.00% | 4.00% |
| 25 | 1.00% | 3.00% | 4.00% |
| 30 | 1.00% | 3.00% | 4.00% |
| 35 | 1.00% | 3.00% | 4.00% |
| Ref | | | 306 + 3.00% |

Base (Economic) salary increase rates as of June 30, 2014 are assumed to be 2.00% for five years, 2.50% for the next five years after that and 3.00% thereafter.

## Single Life Retirement Values Based on RP-2014 Blue Collar for Males and Females

| Sample Attained Ages in 2015 | Future Life Expectancy (years) | |
|---|---|---|
| | Males | Females |
| 45 | 39.26 | 42.64 |
| 50 | 34.29 | 37.57 |
| 55 | 29.50 | 32.66 |
| 60 | 24.95 | 27.90 |
| 65 | 20.62 | 23.29 |
| 70 | 16.58 | 18.93 |
| 75 | 12.88 | 14.91 |
| 80 | 9.62 | 11.33 |

# Probabilities of Service Retirement for Members Older Than Age 43 or with 17 or More Years of Credited Service (Including Prior Service)

| Service | Percent of Eligible Active Members Retiring Within Next Year | | | |
|---|---|---|---|---|
| | Police | | Fire | |
| | 20 & Out | 25 & Out | 20 & Out | 25 & Out |
| 19 | 40% | | 40% | |
| 20 | 40% | | 40% | |
| 21 | 40% | | 40% | |
| 22 | 40% | | 40% | |
| 23 | 40% | | 40% | |
| 24 | 100% | 40% | 100% | 40% |
| 25 | 100% | 40% | 100% | 40% |
| 26 | 100% | 40% | 100% | 40% |
| 27 | 100% | 40% | 100% | 40% |
| 28 | 100% | 40% | 100% | 40% |
| 29 | 100% | 100% | 100% | 100% |
| 30 | 100% | 100% | 100% | 100% |
| 31 | 100% | 100% | 100% | 100% |
| 32 | 100% | 100% | 100% | 100% |
| 33 | 100% | 100% | 100% | 100% |
| 34 | 100% | 100% | 100% | 100% |
| 35 | 100% | 100% | 100% | 100% |
| 36 | 100% | 100% | 100% | 100% |
| 37 | 100% | 100% | 100% | 100% |
| 38 | 100% | 100% | 100% | 100% |
| 39 | 100% | 100% | 100% | 100% |
| 40 | 100% | 100% | 100% | 100% |

| Age | Percent of Eligible Active Members Retiring Within Next Year | |
|---|---|---|
| | Police | Fire |
| 60 | 40% | 100% |
| 61 | 40% | 100% |
| 62 | 40% | 100% |
| 63 | 40% | 100% |
| 64 | 40% | 100% |
| 65 | 100% | 100% |
| 66 | 100% | 100% |
| 67 | 100% | 100% |
| 68 | 100% | 100% |
| 69 | 100% | 100% |
| 70 | 100% | 100% |

Members eligible for 20 & Out are assumed to be first eligible for normal retirement after 19 years of service due to their ability to purchase service. Members eligible for 25 & Out are assumed to be eligible for normal retirement after 24 years of service due to their ability to purchase service. Members are also eligible to retire at age 60 with no service requirement.

# Probabilities of Service Retirement for Members Age 43 or Younger with Less Than 17 Years of Service on June 30, 2014

| Age | Percent of Eligible Active Members Retiring Within Next Year | |
|---|---|---|
| | Police | Fire |
| 50 | 30% | 20% |
| 51 | 30% | 20% |
| 52 | 30% | 20% |
| 53 | 30% | 20% |
| 54 | 30% | 20% |
| 55 | 30% | 20% |
| 56 | 30% | 20% |
| 57 | 30% | 20% |
| 58 | 30% | 20% |
| 59 | 30% | 20% |
| 60 | 100% | 100% |

# Probabilities of Separation

| Sample Ages | Years of Service | % of Active Members Withdrawing within Next Year | |
|---|---|---|---|
| | | Police | Fire |
| ALL | 0 | 8.50% | 5.00% |
| | 1 | 7.50% | 4.00% |
| | 2 | 6.00% | 3.00% |
| | 3 | 5.00% | 2.00% |
| | 4 | 4.50% | 2.00% |
| 25 | 5 & Over | 4.50% | 1.96% |
| 30 | | 3.30% | 1.62% |
| 35 | | 2.30% | 1.11% |
| 40 | | 1.70% | 0.77% |
| 45 | | 1.50% | 0.60% |
| 50 | | 1.10% | 0.51% |
| 55 | | 0.80% | 0.51% |
| 60 | | 0.80% | 0.51% |
| Ref | | 566 | 230 |
| | | 207 | 113 x .85 |

| Sample Ages | % of Active Members Becoming Disabled within Next Year | | | |
|---|---|---|---|---|
| | Police | | Fire | |
| | Ordinary | Duty | Ordinary | Duty |
| 25 | 0.06% | 0.13% | 0.07% | 0.34% |
| 30 | 0.07% | 0.19% | 0.08% | 0.52% |
| 35 | 0.08% | 0.34% | 0.09% | 0.90% |
| 40 | 0.11% | 0.49% | 0.12% | 1.30% |
| 45 | 0.16% | 0.73% | 0.18% | 1.92% |
| 50 | 0.47% | 1.16% | 0.53% | 3.06% |
| 55 | 0.73% | 1.96% | 0.82% | 5.18% |
| 60 | 0.83% | 2.82% | 0.94% | 7.47% |
| Ref | 105 x 0.75 | 90 x 0.85 | 105 x 0.85 | 90 x 2.25 |

# Miscellaneous and Technical Assumptions

| | |
|---|---|
| **Marriage Assumption:** | 100% of males and 100% of females are assumed to be married for purposes of death-in-service benefits. This assumption accounts for potential dependent children/dependent parent death benefits. No other assumption is made for surviving children/dependent parents. Male spouses are assumed to be three years older than female spouses. |
| **Pay Increase Timing:** | Beginning of (Fiscal) year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ending on the valuation date. |
| **Decrement Timing:** | Decrements are assumed to occur mid-year. |
| **Eligibility Testing:** | Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date of decrement. |
| **Decrement Operation:** | Disability and mortality decrements do not operate during the first 5 years of service. Disability and withdrawal do not operate during retirement eligibility. |
| **Longevity in AFC:** | None |
| **Unused Sick Leave Payout:** | None |
| **Administrative Expense:** | 3.0% of payroll. 50% of administrative expenses were allocated to Component I and 50% to Component II based on actual administrative expenses paid. |
| **Post-Retirement COLA:** | A 0.5% COLA was used to determine the SDR and TPL. |
| **Disability Change Age:** | The duty disability benefit is assumed to change at the earlier of age 65 or the time the member would have had 25 years of credited service (including prior service). The benefit at change age was assumed to be 2.0% times final compensation times projected benefit service. |

# Miscellaneous and Technical Assumptions (Concluded)

| | |
|---|---|
| **DROP Assumption:** | Members are assumed to retire or DROP based on assumed rates. 60% of members leaving active service in accordance with the Ret/DROP rates are assumed to DROP/40% and are assumed to retire. Members entering the DROP are assumed to retire 5 years after entering the DROP. Employer contributions are assumed not to be made on DROP payroll. DROP account balances are assumed to grow at 6.75% per year. |
| **Service Credit Accruals:** | Service accruals for calculating benefits begin as of June 30, 2014 for Component I liabilities. However, service in Component II may be used to satisfy benefit eligibility requirements in Component I. |
| **Form of Payment:** | No adjustment has been made for alternate forms of payment elections. |
| **Disability Load** | Duty Disability benefits were increased by 2.0% to account for the Death While Disabled provision based on an analysis of the estimated impact for a sample set of individuals. |
| **IRC Section 415 Limit:** | We assumed that no benefits will be limited by IRC Section 415. The limit is assumed to grow with wage inflation. |
| **IRC Section 401(a)(17) Limit:** | All of the member salary provided falls below the current 401(a)(17) limit. The limit is assumed to grow with wage inflation. |
| **IRC Section 401(h) Limit:** | We did not test for the 401(h) limit on employer contributions for medical benefits. No employer contributions are anticipated in this valuation. |
| **Data adjustments:** | Benefits for newly identified DROP, retired, and deferred members were estimated based on previously reported active member data. |

The rationale for the miscellaneous and technical assumptions is the 2002-2007 Experience Study, modified as necessary for changes in data, administration or plan provisions.

# SECTION E

## CALCULATION OF THE SINGLE DISCOUNT RATE

# Calculation of the Single Discount Rate at End of Year

GASB Statement No. 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 Bond Buyer Index) 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 7.15%; the municipal bond rate is 2.85%; and the resulting Single Discount Rate is 7.15% as of June 30, 2016.

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

The **Projection of Contributions** table shows the development of expected contributions in future years. Normal Cost contributions for future hires are not included (nor are their benefits). For purposes of determining the discount rate as of June 30, 2016, the employer contributions for the 10-year period ending June 30, 2023 are set at 12.25% of payroll. The $20 million transfer from Component II was reflected as part of the FY 2017 employer UAAL contributions for purposes of the SDR determination. Subsequent employer contributions were set at 13.82% of the closed group payroll including contributions for expenses. The actual employer rate will be determined by future funding valuations and is expected to be lower when based on open group payroll. The estimated employer contribution rate of 13.82% exceeds the estimated rate from the 2015 GASB report. The primary factor increasing this estimate was the administrative change related to splitting administrative expenses 50/50 between Component I and Component II plans. Member contributions were set at 6% for members hired before June 30, 2014 and at 8% for members hired after June 30, 2014. The voluntary member contributions were excluded for the projections (and assets). The VPIF was assumed to be 0.50% compound each year beginning in fiscal year 2016. The VPIF reduction under Section 9.5 of the plan was assumed not to occur.

Note that these projections are specifically used to determine the GASB discount rate and should not be interpreted as a funding projection or recommendation.

The **Projection of Plan Fiduciary Net Position** table shows the development of expected asset levels in future years.

# Calculation of the Single Discount Rate at End of Year (Concluded)

The **Present Values of Projected Benefit Payments** table shows the development of the SDR. It breaks down the benefit payments into present values for funded and unfunded portions and shows the equivalent total at the SDR.  For purposes of determining the discount rate as of June 30, 2016, the benefit payments reflect the plan provisions in force as of June 30, 2016.

# Single Discount Rate Development
# Projection of Contributions
# End of Year

| Fiscal Year Ending June 30, | Payroll for Current Employees | Projected Contributions from Current Employees | Projected Employer Service Cost Contribution | Employer Administrative Expense Contributions | Projected Employer UAL Contributions | Projected Total Contributions |
|---|---|---|---|---|---|---|
| 2017 | $ 119,587,163 | $ 7,244,848 | $ 15,445,883 | $ 1,793,807 | $ 17,409,738 | $ 41,894,275 |
| 2018 | 112,501,578 | 6,822,504 | 14,676,701 | 1,687,524 | (2,582,782) | 20,603,948 |
| 2019 | 105,184,992 | 6,386,531 | 13,788,676 | 1,577,775 | (2,481,289) | 19,271,693 |
| 2020 | 98,094,560 | 5,964,360 | 12,897,395 | 1,471,418 | (2,352,230) | 17,980,943 |
| 2021 | 91,452,077 | 5,568,773 | 12,065,861 | 1,371,781 | (2,234,762) | 16,771,652 |
| 2022 | 86,018,221 | 5,245,324 | 11,333,105 | 1,290,273 | (2,086,146) | 15,782,556 |
| 2023 | 81,553,020 | 4,979,539 | 10,649,797 | 1,223,295 | (1,882,847) | 14,969,784 |
| 2024 | 77,099,592 | 4,713,944 | 9,947,736 | 1,156,494 | (445,917) | 15,372,256 |
| 2025 | 72,918,112 | 4,464,530 | 9,293,577 | 1,093,772 | (307,088) | 14,544,791 |
| 2026 | 68,477,879 | 4,199,390 | 8,607,259 | 1,027,168 | (167,988) | 13,665,829 |
| 2027 | 63,989,749 | 3,931,368 | 7,915,753 | 959,846 | (29,602) | 12,777,364 |
| 2028 | 59,545,256 | 3,665,942 | 7,242,295 | 893,179 | 96,112 | 11,897,529 |
| 2029 | 55,186,617 | 3,405,618 | 6,602,197 | 827,799 | 199,048 | 11,034,662 |
| 2030 | 51,128,338 | 3,163,238 | 6,024,837 | 766,925 | 276,262 | 10,231,262 |
| 2031 | 47,150,485 | 2,925,588 | 5,471,267 | 707,257 | 339,599 | 9,443,711 |
| 2032 | 43,081,959 | 2,682,383 | 4,907,170 | 646,229 | 402,287 | 8,638,069 |
| 2033 | 39,065,305 | 2,442,148 | 4,354,441 | 585,980 | 460,000 | 7,842,568 |
| 2034 | 34,890,456 | 2,192,250 | 3,796,764 | 523,357 | 503,165 | 7,015,536 |
| 2035 | 30,841,030 | 1,949,683 | 3,272,702 | 462,615 | 528,173 | 6,213,173 |
| 2036 | 27,519,661 | 1,750,583 | 2,856,864 | 412,795 | 534,682 | 5,554,924 |
| 2037 | 24,537,491 | 1,571,596 | 2,493,965 | 368,062 | 530,056 | 4,963,679 |
| 2038 | 21,872,971 | 1,411,405 | 2,183,464 | 328,095 | 512,179 | 4,435,142 |
| 2039 | 19,014,987 | 1,239,334 | 1,860,425 | 285,225 | 482,998 | 3,867,981 |
| 2040 | 15,558,314 | 1,022,437 | 1,482,409 | 233,375 | 435,011 | 3,173,231 |
| 2041 | 12,297,212 | 810,098 | 1,141,782 | 184,458 | 373,737 | 2,510,075 |
| 2042 | 9,587,400 | 633,551 | 870,621 | 143,811 | 310,939 | 1,958,921 |
| 2043 | 7,407,648 | 491,136 | 660,848 | 111,115 | 252,076 | 1,515,176 |
| 2044 | 5,778,139 | 384,284 | 512,017 | 86,672 | 200,086 | 1,183,059 |
| 2045 | 4,366,178 | 291,262 | 383,763 | 65,493 | 154,328 | 894,846 |
| 2046 | 3,189,008 | 213,248 | 276,542 | 47,835 | 116,474 | 654,100 |
| 2047 | 2,302,651 | 154,065 | 197,022 | 34,540 | 86,759 | 472,385 |
| 2048 | 1,627,518 | 108,995 | 137,401 | 24,413 | 63,175 | 333,985 |
| 2049 | 1,113,687 | 74,372 | 92,255 | 16,705 | 44,997 | 228,329 |
| 2050 | 743,106 | 49,507 | 60,086 | 11,147 | 31,495 | 152,234 |
| 2051 | 496,265 | 33,111 | 39,729 | 7,444 | 21,431 | 101,715 |
| 2052 | 309,085 | 20,438 | 24,433 | 4,636 | 13,659 | 63,166 |
| 2053 | 180,949 | 11,900 | 13,952 | 2,714 | 8,349 | 36,915 |
| 2054 | 104,468 | 6,935 | 7,913 | 1,567 | 4,962 | 21,377 |
| 2055 | 44,318 | 3,005 | 3,209 | 665 | 2,253 | 9,132 |
| 2056 | 16,096 | 1,162 | 1,105 | 241 | 879 | 3,387 |
| 2057 | 4,587 | 367 | 287 | 69 | 278 | 1,001 |
| 2058 | - | - | - | - | - | - |
| 2059 | - | - | - | - | - | - |
| 2060 | - | - | - | - | - | - |
| 2061 | - | - | - | - | - | - |
| 2062 | - | - | - | - | - | - |
| 2063 | - | - | - | - | - | - |
| 2064 | - | - | - | - | - | - |
| 2065 | - | - | - | - | - | - |
| 2066 | - | - | - | - | - | - |

Employer contributions as shown may differ substantially from those determined by a funding valuation.

# Single Discount Rate Development
# Projection of Plan Fiduciary Net Position
# End of Year
# (Net of Voluntary Employee Contribution)

| Fiscal Year Ending June 30, | Projected Beginning Plan Net Position | Projected Total Contributions | Projected Benefit Payments | Projected Administrative Expenses | Projected Investment Earnings at 7.15% | Projected Ending Plan Net Position |
|---|---|---|---|---|---|---|
| | (a) | (b) | (c) | (d) | (e) | (f)=(a)+(b)-(c)-(d)+(e) |
| 2017 | $ 42,252,861 | $ 41,894,275 | $ 1,482,109 | $ 1,793,807 | $ 4,377,852 | $ 85,249,073 |
| 2018 | 85,249,073 | 20,603,948 | 2,317,556 | 1,687,524 | 6,678,474 | 108,526,414 |
| 2019 | 108,526,414 | 19,271,693 | 3,172,173 | 1,577,775 | 8,269,829 | 131,317,988 |
| 2020 | 131,317,988 | 17,980,943 | 3,999,489 | 1,471,418 | 9,828,749 | 153,656,773 |
| 2021 | 153,656,773 | 16,771,652 | 4,776,059 | 1,371,781 | 11,359,704 | 175,640,289 |
| 2022 | 175,640,289 | 15,782,556 | 5,489,824 | 1,290,273 | 12,874,563 | 197,517,311 |
| 2023 | 197,517,311 | 14,969,784 | 6,281,351 | 1,223,295 | 14,384,759 | 219,367,208 |
| 2024 | 219,367,208 | 15,372,256 | 7,065,182 | 1,156,494 | 15,935,976 | 242,453,764 |
| 2025 | 242,453,764 | 14,544,791 | 7,888,791 | 1,093,772 | 17,530,861 | 265,546,853 |
| 2026 | 265,546,853 | 13,665,829 | 8,884,583 | 1,027,168 | 19,118,491 | 288,419,422 |
| 2027 | 288,419,422 | 12,777,364 | 10,112,624 | 959,846 | 20,681,886 | 310,806,203 |
| 2028 | 310,806,203 | 11,897,529 | 11,570,106 | 893,179 | 22,202,767 | 332,443,213 |
| 2029 | 332,443,213 | 11,034,662 | 13,257,150 | 827,799 | 23,662,525 | 353,055,451 |
| 2030 | 353,055,451 | 10,231,262 | 15,066,216 | 766,925 | 25,046,655 | 372,500,227 |
| 2031 | 372,500,227 | 9,443,711 | 16,961,084 | 707,257 | 26,344,812 | 390,620,408 |
| 2032 | 390,620,408 | 8,638,069 | 19,000,429 | 646,229 | 27,542,596 | 407,154,416 |
| 2033 | 407,154,416 | 7,842,568 | 21,112,421 | 585,980 | 28,624,746 | 421,923,330 |
| 2034 | 421,923,330 | 7,015,536 | 23,119,946 | 523,357 | 29,583,337 | 434,878,901 |
| 2035 | 434,878,901 | 6,213,173 | 24,957,169 | 462,615 | 30,419,059 | 446,091,349 |
| 2036 | 446,091,349 | 5,554,924 | 26,666,923 | 412,795 | 31,139,304 | 455,705,859 |
| 2037 | 455,705,859 | 4,963,679 | 28,287,788 | 368,062 | 31,750,596 | 463,764,283 |
| 2038 | 463,764,283 | 4,435,142 | 29,811,163 | 328,095 | 32,256,088 | 470,316,255 |
| 2039 | 470,316,255 | 3,867,981 | 31,351,492 | 285,225 | 32,652,018 | 475,199,537 |
| 2040 | 475,199,537 | 3,173,231 | 32,948,929 | 233,375 | 32,922,463 | 478,112,928 |
| 2041 | 478,112,928 | 2,510,075 | 34,482,631 | 184,458 | 33,055,307 | 479,011,221 |
| 2042 | 479,011,221 | 1,958,921 | 35,910,908 | 143,811 | 33,051,420 | 477,966,844 |
| 2043 | 477,966,844 | 1,515,176 | 37,089,373 | 111,115 | 32,920,903 | 475,202,434 |
| 2044 | 475,202,434 | 1,183,059 | 38,027,850 | 86,672 | 32,679,467 | 470,950,439 |
| 2045 | 470,950,439 | 894,846 | 38,875,796 | 65,493 | 32,336,277 | 465,240,272 |
| 2046 | 465,240,272 | 654,100 | 39,564,344 | 47,835 | 31,895,971 | 458,178,164 |
| 2047 | 458,178,164 | 472,385 | 40,060,133 | 34,540 | 31,367,695 | 449,923,571 |
| 2048 | 449,923,571 | 333,985 | 40,362,400 | 24,413 | 30,762,366 | 440,633,108 |
| 2049 | 440,633,108 | 228,329 | 40,501,226 | 16,705 | 30,089,779 | 430,433,285 |
| 2050 | 430,433,285 | 152,234 | 40,526,614 | 11,147 | 29,357,122 | 419,404,880 |
| 2051 | 419,404,880 | 101,715 | 40,413,332 | 7,444 | 28,570,926 | 407,656,745 |
| 2052 | 407,656,745 | 63,166 | 40,208,452 | 4,636 | 27,736,876 | 395,243,700 |
| 2053 | 395,243,700 | 36,915 | 39,898,689 | 2,714 | 26,859,372 | 382,238,584 |
| 2054 | 382,238,584 | 21,377 | 39,471,631 | 1,567 | 25,944,004 | 368,730,766 |
| 2055 | 368,730,766 | 9,132 | 38,942,900 | 665 | 24,996,372 | 354,792,705 |
| 2056 | 354,792,705 | 3,387 | 38,306,554 | 241 | 24,021,971 | 340,511,268 |
| 2057 | 340,511,268 | 1,001 | 37,592,181 | 69 | 23,025,868 | 325,945,888 |
| 2058 | 325,945,888 | - | 36,792,274 | - | 22,012,514 | 311,166,128 |
| 2059 | 311,166,128 | - | 35,913,435 | - | 20,986,637 | 296,239,329 |
| 2060 | 296,239,329 | - | 34,970,472 | - | 19,952,500 | 281,221,358 |
| 2061 | 281,221,358 | - | 33,965,452 | - | 18,914,024 | 266,169,930 |
| 2062 | 266,169,930 | - | 32,902,867 | - | 17,875,179 | 251,142,241 |
| 2063 | 251,142,241 | - | 31,785,729 | - | 16,839,947 | 236,196,459 |
| 2064 | 236,196,459 | - | 30,617,220 | - | 15,812,377 | 221,391,617 |
| 2065 | 221,391,617 | - | 29,401,673 | - | 14,796,536 | 206,786,479 |
| 2066 | 206,786,479 | - | 28,143,752 | - | 13,796,463 | 192,439,191 |

Employer contributions as shown may differ substantially from those determined by a funding valuation.

# Single Discount Rate Development
# Projection of Plan Fiduciary Net Position
# End of Year (Concluded)

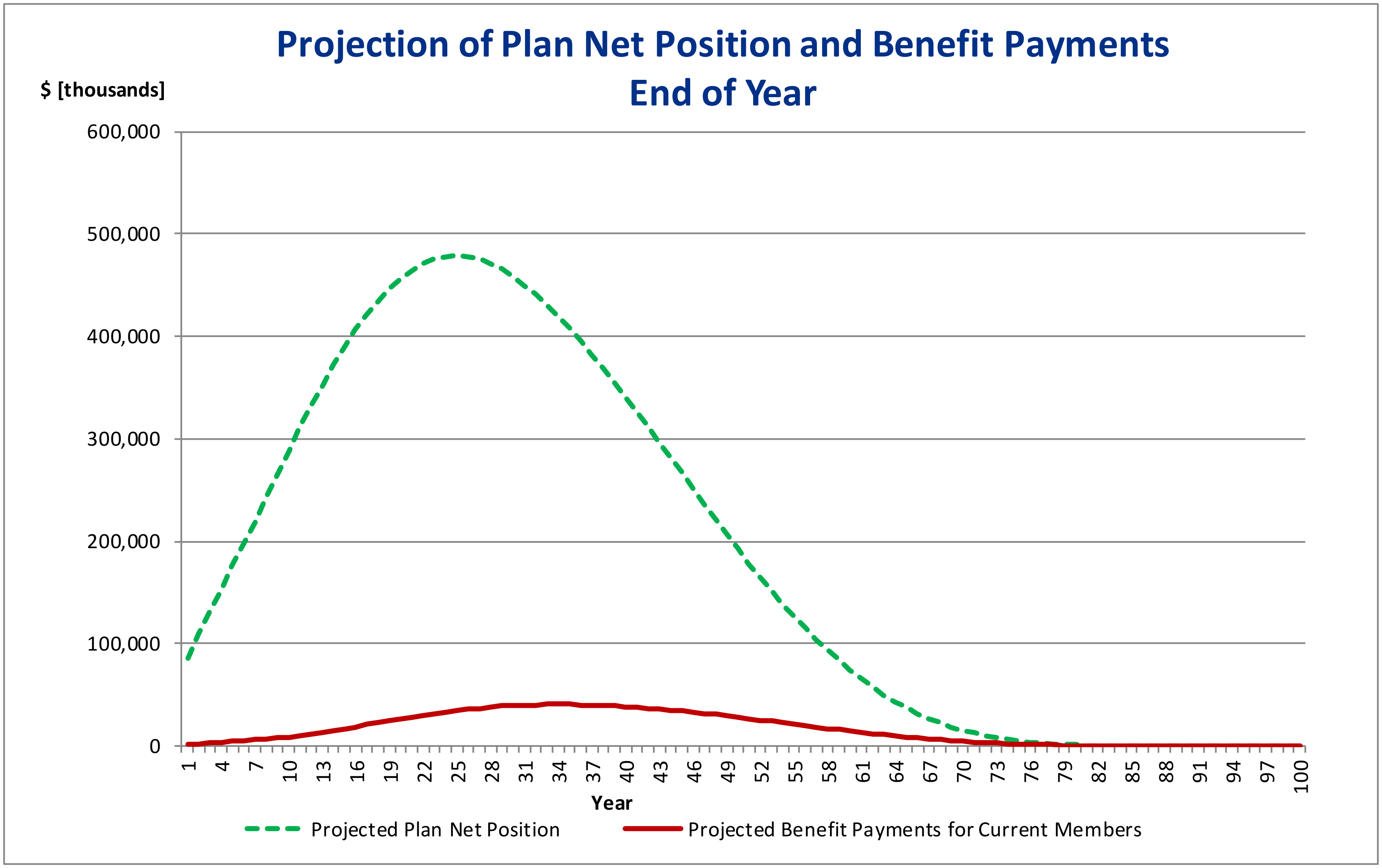
| Fiscal Year Ending June 30, | Projected Beginning Plan Net Position | Projected Total Contributions | Projected Benefit Payments | Projected Administrative Expenses | Projected Investment Earnings at 7.15% | Projected Ending Plan Net Position |
|---|---|---|---|---|---|---|
| | (a) | (b) | (c) | (d) | (e) | (f)=(a)+(b)-(c)-(d)+(e) |
| 2067 | $ 192,439,191 | $ - | $ 26,848,819 | $ - | $ 12,816,127 | $ 178,406,499 |
| 2068 | 178,406,499 | - | 25,522,766 | - | 11,859,377 | 164,743,110 |
| 2069 | 164,743,110 | - | 24,172,054 | - | 10,929,899 | 151,500,955 |
| 2070 | 151,500,955 | - | 22,803,919 | - | 10,031,152 | 138,728,188 |
| 2071 | 138,728,188 | - | 21,426,267 | - | 9,166,300 | 126,468,221 |
| 2072 | 126,468,221 | - | 20,047,353 | - | 8,338,157 | 114,759,025 |
| 2073 | 114,759,025 | - | 18,675,551 | - | 7,549,145 | 103,632,619 |
| 2074 | 103,632,619 | - | 17,319,071 | - | 6,801,264 | 93,114,812 |
| 2075 | 93,114,812 | - | 15,985,762 | - | 6,096,084 | 83,225,133 |
| 2076 | 83,225,133 | - | 14,683,057 | - | 5,434,739 | 73,976,815 |
| 2077 | 73,976,815 | - | 13,417,737 | - | 4,817,939 | 65,377,017 |
| 2078 | 65,377,017 | - | 12,195,834 | - | 4,245,982 | 57,427,166 |
| 2079 | 57,427,166 | - | 11,022,874 | - | 3,718,777 | 50,123,069 |
| 2080 | 50,123,069 | - | 9,904,012 | - | 3,235,843 | 43,454,900 |
| 2081 | 43,454,900 | - | 8,843,719 | - | 2,796,320 | 37,407,501 |
| 2082 | 37,407,501 | - | 7,845,682 | - | 2,398,995 | 31,960,814 |
| 2083 | 31,960,814 | - | 6,912,759 | - | 2,042,333 | 27,090,389 |
| 2084 | 27,090,389 | - | 6,046,827 | - | 1,724,521 | 22,768,082 |
| 2085 | 22,768,082 | - | 5,248,917 | - | 1,443,508 | 18,962,673 |
| 2086 | 18,962,673 | - | 4,519,148 | - | 1,197,061 | 15,640,586 |
| 2087 | 15,640,586 | - | 3,856,747 | - | 982,803 | 12,766,643 |
| 2088 | 12,766,643 | - | 3,260,282 | - | 798,272 | 10,304,633 |
| 2089 | 10,304,633 | - | 2,727,804 | - | 640,946 | 8,217,775 |
| 2090 | 8,217,775 | - | 2,256,890 | - | 508,280 | 6,469,165 |
| 2091 | 6,469,165 | - | 1,844,638 | - | 397,738 | 5,022,265 |
| 2092 | 5,022,265 | - | 1,487,795 | - | 306,821 | 3,841,291 |
| 2093 | 3,841,291 | - | 1,182,816 | - | 233,097 | 2,891,571 |
| 2094 | 2,891,571 | - | 925,818 | - | 174,221 | 2,139,974 |
| 2095 | 2,139,974 | - | 712,612 | - | 127,972 | 1,555,335 |
| 2096 | 1,555,335 | - | 538,729 | - | 92,279 | 1,108,885 |
| 2097 | 1,108,885 | - | 399,499 | - | 65,250 | 774,636 |
| 2098 | 774,636 | - | 290,207 | - | 45,191 | 529,619 |
| 2099 | 529,619 | - | 206,250 | - | 30,622 | 353,990 |
| 2100 | 353,990 | - | 143,230 | - | 20,278 | 231,038 |
| 2101 | 231,038 | - | 97,063 | - | 13,109 | 147,084 |
| 2102 | 147,084 | - | 64,103 | - | 8,264 | 91,245 |
| 2103 | 91,245 | - | 41,214 | - | 5,076 | 55,108 |
| 2104 | 55,108 | - | 25,768 | - | 3,035 | 32,374 |
| 2105 | 32,374 | - | 15,646 | - | 1,765 | 18,493 |
| 2106 | 18,493 | - | 9,221 | - | 998 | 10,271 |
| 2107 | 10,271 | - | 5,277 | - | 549 | 5,542 |
| 2108 | 5,542 | - | 2,932 | - | 293 | 2,903 |
| 2109 | 2,903 | - | 1,584 | - | 152 | 1,471 |
| 2110 | 1,471 | - | 830 | - | 76 | 717 |
| 2111 | 717 | - | 420 | - | 37 | 334 |
| 2112 | 334 | - | 204 | - | 17 | 147 |
| 2113 | 147 | - | 94 | - | 7 | 59 |
| 2114 | 59 | - | 41 | - | 3 | 21 |
| 2115 | 21 | - | 22 | - | 1 | - |
| 2116 | - | - | - | - | - | - |

# Single Discount Rate Development
# Present Values of Projected Benefits
# End of Year

| Fiscal Year Ending June 30, | Projected Beginning Plan Net Position | Projected Benefit Payments | Funded Portion of Benefit Payments | Unfunded Portion of Benefit Payments | Present Value of Funded Benefit Payments using Expected Return Rate (v) | Unfunded Benefit Payments using Municipal Bond Rate (vf) | Present Value of Benefit Payments using Single Discount Rate (sdr) |
|---|---|---|---|---|---|---|---|
| (a) | (b) | (c) | (d) | (e) | (f)=(d)*v^((a)-.5) | (g)=(e)*vf ^((a)-.5 | )=((c)/(1+sdr)^(a-. |
| 2017 | $ 42,252,861 | $ 1,482,109 | $ 1,482,109 | $ - | $ 1,431,805 | $ - | $ 1,431,805 |
| 2018 | 85,249,073 | 2,317,556 | 2,317,556 | - | 2,089,498 | - | 2,089,498 |
| 2019 | 108,526,414 | 3,172,173 | 3,172,173 | - | 2,669,171 | - | 2,669,171 |
| 2020 | 131,317,988 | 3,999,489 | 3,999,489 | - | 3,140,739 | - | 3,140,739 |
| 2021 | 153,656,773 | 4,776,059 | 4,776,059 | - | 3,500,297 | - | 3,500,297 |
| 2022 | 175,640,289 | 5,489,824 | 5,489,824 | - | 3,754,927 | - | 3,754,927 |
| 2023 | 197,517,311 | 6,281,351 | 6,281,351 | - | 4,009,626 | - | 4,009,626 |
| 2024 | 219,367,208 | 7,065,182 | 7,065,182 | - | 4,209,030 | - | 4,209,030 |
| 2025 | 242,453,764 | 7,888,791 | 7,888,791 | - | 4,386,084 | - | 4,386,084 |
| 2026 | 265,546,853 | 8,884,583 | 8,884,583 | - | 4,610,111 | - | 4,610,111 |
| 2027 | 288,419,422 | 10,112,624 | 10,112,624 | - | 4,897,180 | - | 4,897,180 |
| 2028 | 310,806,203 | 11,570,106 | 11,570,106 | - | 5,229,105 | - | 5,229,105 |
| 2029 | 332,443,213 | 13,257,150 | 13,257,150 | - | 5,591,753 | - | 5,591,753 |
| 2030 | 353,055,451 | 15,066,216 | 15,066,216 | - | 5,930,753 | - | 5,930,753 |
| 2031 | 372,500,227 | 16,961,084 | 16,961,084 | - | 6,231,134 | - | 6,231,134 |
| 2032 | 390,620,408 | 19,000,429 | 19,000,429 | - | 6,514,554 | - | 6,514,554 |
| 2033 | 407,154,416 | 21,112,421 | 21,112,421 | - | 6,755,650 | - | 6,755,650 |
| 2034 | 421,923,330 | 23,119,946 | 23,119,946 | - | 6,904,365 | - | 6,904,365 |
| 2035 | 434,878,901 | 24,957,169 | 24,957,169 | - | 6,955,688 | - | 6,955,688 |
| 2036 | 446,091,349 | 26,666,923 | 26,666,923 | - | 6,936,262 | - | 6,936,262 |
| 2037 | 455,705,859 | 28,287,788 | 28,287,788 | - | 6,866,879 | - | 6,866,879 |
| 2038 | 463,764,283 | 29,811,163 | 29,811,163 | - | 6,753,784 | - | 6,753,784 |
| 2039 | 470,316,255 | 31,351,492 | 31,351,492 | - | 6,628,790 | - | 6,628,790 |
| 2040 | 475,199,537 | 32,948,929 | 32,948,929 | - | 6,501,674 | - | 6,501,674 |
| 2041 | 478,112,928 | 34,482,631 | 34,482,631 | - | 6,350,269 | - | 6,350,269 |
| 2042 | 479,011,221 | 35,910,908 | 35,910,908 | - | 6,172,000 | - | 6,172,000 |
| 2043 | 477,966,844 | 37,089,373 | 37,089,373 | - | 5,949,176 | - | 5,949,176 |
| 2044 | 475,202,434 | 38,027,850 | 38,027,850 | - | 5,692,682 | - | 5,692,682 |
| 2045 | 470,950,439 | 38,875,796 | 38,875,796 | - | 5,431,281 | - | 5,431,281 |
| 2046 | 465,240,272 | 39,564,344 | 39,564,344 | - | 5,158,635 | - | 5,158,635 |
| 2047 | 458,178,164 | 40,060,133 | 40,060,133 | - | 4,874,735 | - | 4,874,735 |
| 2048 | 449,923,571 | 40,362,400 | 40,362,400 | - | 4,583,777 | - | 4,583,777 |
| 2049 | 440,633,108 | 40,501,226 | 40,501,226 | - | 4,292,620 | - | 4,292,620 |
| 2050 | 430,433,285 | 40,526,614 | 40,526,614 | - | 4,008,690 | - | 4,008,690 |
| 2051 | 419,404,880 | 40,413,332 | 40,413,332 | - | 3,730,737 | - | 3,730,737 |
| 2052 | 407,656,745 | 40,208,452 | 40,208,452 | - | 3,464,138 | - | 3,464,138 |
| 2053 | 395,243,700 | 39,898,689 | 39,898,689 | - | 3,208,073 | - | 3,208,073 |
| 2054 | 382,238,584 | 39,471,631 | 39,471,631 | - | 2,961,955 | - | 2,961,955 |
| 2055 | 368,730,766 | 38,942,900 | 38,942,900 | - | 2,727,279 | - | 2,727,279 |
| 2056 | 354,792,705 | 38,306,554 | 38,306,554 | - | 2,503,699 | - | 2,503,699 |
| 2057 | 340,511,268 | 37,592,181 | 37,592,181 | - | 2,293,055 | - | 2,293,055 |
| 2058 | 325,945,888 | 36,792,274 | 36,792,274 | - | 2,094,505 | - | 2,094,505 |
| 2059 | 311,166,128 | 35,913,435 | 35,913,435 | - | 1,908,049 | - | 1,908,049 |
| 2060 | 296,239,329 | 34,970,472 | 34,970,472 | - | 1,733,971 | - | 1,733,971 |
| 2061 | 281,221,358 | 33,965,452 | 33,965,452 | - | 1,571,758 | - | 1,571,758 |
| 2062 | 266,169,930 | 32,902,867 | 32,902,867 | - | 1,420,986 | - | 1,420,986 |
| 2063 | 251,142,241 | 31,785,729 | 31,785,729 | - | 1,281,138 | - | 1,281,138 |
| 2064 | 236,196,459 | 30,617,220 | 30,617,220 | - | 1,151,695 | - | 1,151,695 |
| 2065 | 221,391,617 | 29,401,673 | 29,401,673 | - | 1,032,171 | - | 1,032,171 |
| 2066 | 206,786,479 | 28,143,752 | 28,143,752 | - | 922,081 | - | 922,081 |

# Single Discount Rate Development
# Present Values of Projected Benefits
# End of Year (Concluded)

| Fiscal Year Ending June 30, | Projected Beginning Plan Net Position | Projected Benefit Payments | Funded Portion of Benefit Payments | Unfunded Portion of Benefit Payments | Present Value of Funded Benefit Payments using Expected Return Rate (v) | Unfunded Benefit Payments using Municipal Bond Rate (vf) | Present Value of Benefit Payments using Single Discount Rate (sdr) |
|---|---|---|---|---|---|---|---|
| (a) | (b) | (c) | (d) | (e) | (f)=(d)*v^((a)-.5) | (g)=(e)*vf ^((a)-.5) | =((c)/(1+sdr)^(a-. |
| 2067 | $ 192,439,191 | $ 26,848,819 | $ 26,848,819 | $ - | $ 820,957 | $ - | $ 820,957 |
| 2068 | 178,406,499 | 25,522,766 | 25,522,766 | - | 728,334 | - | 728,334 |
| 2069 | 164,743,110 | 24,172,054 | 24,172,054 | - | 643,761 | - | 643,761 |
| 2070 | 151,500,955 | 22,803,919 | 22,803,919 | - | 566,798 | - | 566,798 |
| 2071 | 138,728,188 | 21,426,267 | 21,426,267 | - | 497,019 | - | 497,019 |
| 2072 | 126,468,221 | 20,047,353 | 20,047,353 | - | 434,002 | - | 434,002 |
| 2073 | 114,759,025 | 18,675,551 | 18,675,551 | - | 377,325 | - | 377,325 |
| 2074 | 103,632,619 | 17,319,071 | 17,319,071 | - | 326,569 | - | 326,569 |
| 2075 | 93,114,812 | 15,985,762 | 15,985,762 | - | 281,314 | - | 281,314 |
| 2076 | 83,225,133 | 14,683,057 | 14,683,057 | - | 241,147 | - | 241,147 |
| 2077 | 73,976,815 | 13,417,737 | 13,417,737 | - | 205,661 | - | 205,661 |
| 2078 | 65,377,017 | 12,195,834 | 12,195,834 | - | 174,459 | - | 174,459 |
| 2079 | 57,427,166 | 11,022,874 | 11,022,874 | - | 147,158 | - | 147,158 |
| 2080 | 50,123,069 | 9,904,012 | 9,904,012 | - | 123,398 | - | 123,398 |
| 2081 | 43,454,900 | 8,843,719 | 8,843,719 | - | 102,835 | - | 102,835 |
| 2082 | 37,407,501 | 7,845,682 | 7,845,682 | - | 85,142 | - | 85,142 |
| 2083 | 31,960,814 | 6,912,759 | 6,912,759 | - | 70,012 | - | 70,012 |
| 2084 | 27,090,389 | 6,046,827 | 6,046,827 | - | 57,155 | - | 57,155 |
| 2085 | 22,768,082 | 5,248,917 | 5,248,917 | - | 46,303 | - | 46,303 |
| 2086 | 18,962,673 | 4,519,148 | 4,519,148 | - | 37,205 | - | 37,205 |
| 2087 | 15,640,586 | 3,856,747 | 3,856,747 | - | 29,633 | - | 29,633 |
| 2088 | 12,766,643 | 3,260,282 | 3,260,282 | - | 23,378 | - | 23,378 |
| 2089 | 10,304,633 | 2,727,804 | 2,727,804 | - | 18,255 | - | 18,255 |
| 2090 | 8,217,775 | 2,256,890 | 2,256,890 | - | 14,096 | - | 14,096 |
| 2091 | 6,469,165 | 1,844,638 | 1,844,638 | - | 10,752 | - | 10,752 |
| 2092 | 5,022,265 | 1,487,795 | 1,487,795 | - | 8,093 | - | 8,093 |
| 2093 | 3,841,291 | 1,182,816 | 1,182,816 | - | 6,005 | - | 6,005 |
| 2094 | 2,891,571 | 925,818 | 925,818 | - | 4,387 | - | 4,387 |
| 2095 | 2,139,974 | 712,612 | 712,612 | - | 3,151 | - | 3,151 |
| 2096 | 1,555,335 | 538,729 | 538,729 | - | 2,223 | - | 2,223 |
| 2097 | 1,108,885 | 399,499 | 399,499 | - | 1,539 | - | 1,539 |
| 2098 | 774,636 | 290,207 | 290,207 | - | 1,043 | - | 1,043 |
| 2099 | 529,619 | 206,250 | 206,250 | - | 692 | - | 692 |
| 2100 | 353,990 | 143,230 | 143,230 | - | 448 | - | 448 |
| 2101 | 231,038 | 97,063 | 97,063 | - | 284 | - | 284 |
| 2102 | 147,084 | 64,103 | 64,103 | - | 175 | - | 175 |
| 2103 | 91,245 | 41,214 | 41,214 | - | 105 | - | 105 |
| 2104 | 55,108 | 25,768 | 25,768 | - | 61 | - | 61 |
| 2105 | 32,374 | 15,646 | 15,646 | - | 35 | - | 35 |
| 2106 | 18,493 | 9,221 | 9,221 | - | 19 | - | 19 |
| 2107 | 10,271 | 5,277 | 5,277 | - | 10 | - | 10 |
| 2108 | 5,542 | 2,932 | 2,932 | - | 5 | - | 5 |
| 2109 | 2,903 | 1,584 | 1,584 | - | 3 | - | 3 |
| 2110 | 1,471 | 830 | 830 | - | 1 | - | 1 |
| 2111 | 717 | 420 | 420 | - | 1 | - | 1 |
| 2112 | 334 | 204 | 204 | - | 0 | - | 0 |
| 2113 | 147 | 94 | 94 | - | 0 | - | 0 |
| 2114 | 59 | 41 | 41 | - | 0 | - | 0 |
| 2115 | 21 | 22 | 22 | - | 0 | - | 0 |
| 2116 | - | - | - | - | - | - | - |
| | | | | **Totals** | $ 215,108,959 | $ - | $ 215,108,959 |


Projection of Plan Net Position and Benefit Payments
End of Year
$ [thousands]
600,000
500,000
400,000
300,000
200,000
100,000
0
1
4
7
10
13
16
19
22
25
28
31
34
37
40
43
46
49
52
55
58
61
64
67
70
73
76
79
82
85
88
91
94
97
100
Year
Projected Plan Net Position
Projected Benefit Payments for Current Members

# Section F

## Glossary of Terms

# Glossary of Terms

| | |
|---|---|
| ***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. |
| ***Accrued Service*** | Service credited under the system which was rendered before the date of the actuarial valuation. |
| ***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 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 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 Payment*** — The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.

***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).

***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 covered employees, which is typically only the pensionable pay and does not include pay above any pay cap.

***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.

***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.

***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 funding 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. |
| ***GASB*** | The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities. |
| ***Fiduciary Net Position*** | The fiduciary net position is the value of the assets of the trust. |
| ***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 contribution entities to plan members for benefits provided through a defined benefit pension plan. |
| ***Non-Employer Contribution Entities*** | Non-employer contribution 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 statement plan members are not considered non-employer contribution entities. |
| ***Normal Cost*** | The actuarial present value of the pension trust benefits allocated to the current year by the actuarial cost method. Also known as 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. |
| ***PERSIA*** | Public Employees Retirement System Investment Act. |
| ***POA*** | The 8th Amended Plan for the Adjustment of the Debt of the City of Detroit. |
| ***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. Also known as normal cost. |
| ***Single Discount Rate (SDR)*** | The discount rate used in determining the Total Pension Liability. |
| ***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:<br><br>1. Service Cost<br>2. Interest on the Total Pension Liability<br>3. Current-Period Benefit Changes<br>4. Employee Contributions (made negative for addition here)<br>5. Projected Earnings on Plan Investments (made negative for addition here)<br>6. Pension Plan Administrative Expense<br>7. Other Changes in Plan Fiduciary Net Position<br>8. Recognition of Outflow (Inflow) of Resources due to Liabilities<br>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 the GASB Statement No. 67, the valuation asset is equal to the market value of assets. |
| ***Variable Pension Improvement Factor (VPIF)*** | An increase on the Component I Retirement Allowance of 1% compound subject to plan restrictions. |

GRS Retirement Consulting

800.521.0498 | P: 248.799.9000 | F: 248.799.9020 | www.grsconsulting.com

August 31, 2017

Mr. David Cetlinski, Deputy Executive Secretary
The Police and Fire Retirement System
of the City of Detroit
One Detroit Center
500 Woodward Avenue, Suite 3000
Detroit, MI 48226-3534

Dear Dave:

Please find enclosed 20 copies of the GASB Statement No. 68 Employer Reporting Accounting Schedules report of Component I of the Police and Fire Retirement System of the City of Detroit.

Sincerely,

Kenneth G. Alberts

Kenneth G. Alberts

KGA:mrb
Enclosure

cc: Cynthia A. Thomas, City of Detroit Retirement Systems
Lamonica Arrington-Cabean, City of Detroit Retirement Systems
David T. Kausch, GRS
Judith A. Kermans, GRS

One Towne Square | Suite 800 | Southfield, Michigan 48076-3723