

City of Detroit Employees Death Benefit Plan

Annual Actuarial Valuation Report
June 30, 2017



Table of Contents

| Section | Page | |
|----------------|-------------|-----------------------------------------------------|
| | 1-2 | Introduction |
| A | | VALUATION RESULTS |
| | 1 | Executive Summary |
| | 2-3 | Computed Contributions |
| | 4-5 | Summary Statement of Resources and Obligations |
| | 6 | Historical Schedule of Open Plan Results |
| | 7-8 | Comments |
| | 9 | Other Observations |
| | 10 | Gain (Loss) Analysis |
| B | | DATA USED IN VALUATION |
| | 1 | Summary of Benefit Provisions and Contributions |
| | 2 | Comparative Statement |
| | 3-4 | Demographic Information |
| | 5 | Data Adjustments |
| | 6 | Reconciliation of Raw Data |
| | 7-10 | Asset Information |
| C | | SUMMARY OF VALUATION METHODS AND ASSUMPTIONS |
| | 1 | Actuarial Cost Method |
| | 2-8 | Actuarial Assumptions |
| Appendix | 1-2 | Glossary |

August 24, 2018

Governing Board
City of Detroit
Employees Death Benefit Plan
Detroit, Michigan

Dear Board Members:

The results of the **Annual Actuarial Valuation** of the liabilities for benefits provided by the City of Detroit Employees Death Benefit Plan are presented in this report. The purpose of the valuation was to measure the Plan's funding progress for the year ending June 30, 2017 and to establish the employer contribution for the period ending June 30, 2019, based on the Board's funding policy. The results of the valuation may not be applicable for other purposes. In particular, information in this study is not suitable for reporting requirements under GASB Statement Nos. 74 or 75.

Contribution determinations based on the Board's funding policy shown in this report are for the open group. The employer no longer has an obligation to fund benefits for the closed group. The Board previously bifurcated the assets between the two groups and then offered a cash-out option to closed group members. No additional employer contributions will be made to the closed plan. Benefits will be paid to closed plan members only to the extent assets are available. The window for the cash-out option took place before the valuation date. See the Comments on pages A-7 and A-8 for further details of the closed plan.

The date of the valuation was **June 30, 2017**.

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 Plan staff concerning active members, retirees and beneficiaries, and Trust assets as of the valuation date. We checked for year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by Plan staff.

Your attention is directed particularly to the Comments section starting on page A-7 and the contribution amounts on page A-3. The contribution amounts are the amounts determined based on the City Ordinance and Board Policy. Users of this report should be aware that such contributions do not guarantee benefit security. We suggest the Board consider benefit security when adopting contribution amounts and remind the Board that they are free to adopt higher contributions than presented herein.

This report has been prepared by individuals who have substantial experience valuing public sector benefit programs. 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 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.

The assumptions used in the valuation concerning future experience are summarized in Section C of this report. The actuarial assumptions used for the valuation are set by the Board based upon advice of the actuary and other parties and are therefore a "prescribed assumption set by another party" as discussed in Actuarial Standards of Practice. In our judgement, all of the actuarial assumptions used for the valuation are reasonable for purposes of the measurement being taken.

Unfunded Accrued Liabilities shown in this report do not include any unfunded amounts for the Closed Plan, unless specifically labeled otherwise.

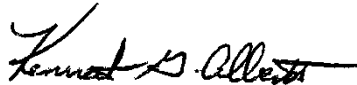
A determination regarding the ability of the plan sponsor to make contributions when due is outside the scope of the assignment, outside our area of expertise and was, therefore, not performed.

This report was prepared at the request of the Governing Board of the City of Detroit Employees Death Benefit Plan and their staff and is intended for their use. This report may be supplied to other parties but only with the permission of the Board and only in its entirety. GRS is not responsible for unauthorized use of this report. The authors of this report are available to answer questions from the Board and staff as needed.


Respectfully submitted,



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



Kenneth G. Alberts



Judith A. Kermans, EA, FCA, MAAA

DTK:rmn



SECTION A

VALUATION RESULTS

Executive Summary

| | | |
|-----------------------------------------------------------------------------|---------------|---------------|
| Valuation Date | June 30, 2017 | June 30, 2016 |
| Contributions for Fiscal Year Ending | June 30, 2019 | June 30, 2018 |
| Membership | | |
| Number of | | |
| Active Members (LSA and Fire Equivalent) | 643 | 601 |
| Active Members (Other) | 6,997 | 6,117 |
| Active Members - Total | 7,640 | 6,718 |
| Retirees and Beneficiaries (Including DROP) | 1,665 | 1,239 |
| Inactive, Nonretired Members | - | - |
| Total | 9,305 | 7,957 |
| Covered Payroll | N/A | N/A |
| Required Employer Contributions | | |
| Ordinance Annual Employer Contribution (LSA and Fire Equivalents) | \$ 20.70 | \$ 20.70 |
| Ordinance Annual Employer Contribution (Other) | \$ 13.30 | \$ 13.30 |
| Average Annual Amount Per Active Member | \$ 13.92 | \$ 13.96 |
| Estimated Employer Contribution | \$ 106,370 | \$ 93,797 |
| Assets | | |
| Market Value (without future retired/employee contributions) | \$ 3,893,653 | \$ 3,701,238 |
| Actuarial Value (without future retired/employee contributions) | \$ 3,963,739 | \$ 3,952,922 |
| Return on Market value - (net of investment and administrative expenses) | 8.3% | 1.1% |
| Ratio - Actuarial Value to Market Value | 101.8% | 106.8% |
| Return on Actuarial Value of Assets | 3.0% | 5.1% |
| Actuarial Information | | |
| Employer Normal Cost per Active Member \$ | \$ 3.92 | \$ 2.85 |
| Actuarial Accrued Liability (AAL) | \$ 3,687,234 | \$ 3,292,916 |
| Unfunded Actuarial Accrued Liability (UAAL) | (330,831) | (709,477) |
| Funded Ratio | 109.0% | 121.5% |

Highlights/Changes

- No changes to benefit provisions
- No changes to actuarial assumption and methods
- The aggregate experience gain/loss was a loss of approximately \$509,000

The executive summary gives an overview of the entire report. It cannot be used as a substitute for a thorough reading of the full report.

Funding Objective

The funding objective of the Death Benefit Plan has been to establish and receive level dollar contributions which will accumulate sufficient reserves during each member's working lifetime to pay pre and post retirement death benefits.

Contribution Rates

The Death Benefit Plan is supported by member contributions (active and retired), City contributions and investment income from Plan assets. Active member and City contributions are only used to fund Open group member benefits.

City contributions for the open plan which satisfy the funding objective are determined by the annual actuarial valuation and are sufficient to:

- (1) Cover the actuarial present value of benefits allocated to the current year by the actuarial cost method described in Section C (the normal cost); and
- (2) Finance over a period of future years the actuarial present value of benefits not covered by valuation assets and anticipated future normal costs (unfunded actuarial accrued liability).

We understand the Board funding policy is to set employer contributions equal to the greater of:

- 1) Normal cost plus a 30-year amortization of unfunded actuarial accrued liability on a per active person basis; and
- 2) The per active person rates specified in the ordinance.

Computed contribution amounts are shown on page A-3.

Contributions to Provide Death Benefits Determined as of June 30, 2017 (Open Plan Only)

| Annual Per Member Contributions for | Fiscal Year Ending June 30, 2019 |
|----------------------------------------------------------------------------------------------|-------------------------------------|
| Normal Cost of Benefits: | |
| A. Age & service retirement death benefits | \$ 6.85 |
| B. Pre-retirement death benefits | 6.12 |
| C. Disability retirement death benefits | 1.57 |
| D. Total Normal Cost (A+B+C) | \$ 14.54 |
| E. Average Employee Contributions | 10.62 |
| F. Employer Normal Cost (D-E) | \$ 3.92 |
| G. Unfunded Actuarial Accrued Liabilities [#] | 0.00 |
| H. Total Computed Contributions (D+G) | 14.54 |
| Total Computed Employer | |
| I. Contribution Per Member (H-E) | \$ 3.92 |
| J. Average Contributions Per Ordinance | \$ 13.92 |
| K. Additional Contributions Needed (I-J, not less than zero) | \$ 0.00 |
| L. Number of Active Members | 7,640 |
| M. Estimated Total Employer Contribution Dollars (L times the Greater of I and J) | \$106,370 |

The open group is 109% funded as of June 30, 2017. The actuarially determined contributions are below the Ordinance Rate and the assets in excess of accrued liabilities were not used as a credit against future contribution requirements. This is based on our understanding of Board policy.

Amounts shown are for the open group only and are based on: 1) the Board's allocation of assets effective 12/31/2017, and 2) the Board's funding policy of amortizing any UAAL over a 30-year period, and setting the rates in the ordinance as a minimum. Ordinance states employer contributes \$13.30 annually per active member (\$20.70 for LSA), while active members each contribute \$10.40 annually (\$13.00 for LSA).

A determination regarding the ability of the plan sponsor to make contributions when due is outside the scope of the assignment, outside our area of expertise and was, therefore, not performed.

Summary Statement of System Resources and Obligations (Open Plan Only)

Present Resources and Expected Future Resources

| | |
|----------------------------------------------------------------------------------|-------------|
| A. Present valuation assets: | |
| 1. Net open plan assets from System financial statements (Market Value) | \$3,893,653 |
| 2. Market adjustment | 70,086 |
| 3. Open Plan funding value of assets | 3,963,739 |
| 4. Present value of future retiree contributions | 54,326 |
| 5. Open Plan valuation assets applied | 4,018,065 |
| B. Actuarial present value of expected future member and employer contributions: | |
| 1. For normal costs | 589,675 |
| 2. For unfunded actuarial accrued liability | (330,831) |
| 3. Total | 258,844 |
| C. Total Present and Expected Future Resources: [@] | \$4,276,909 |

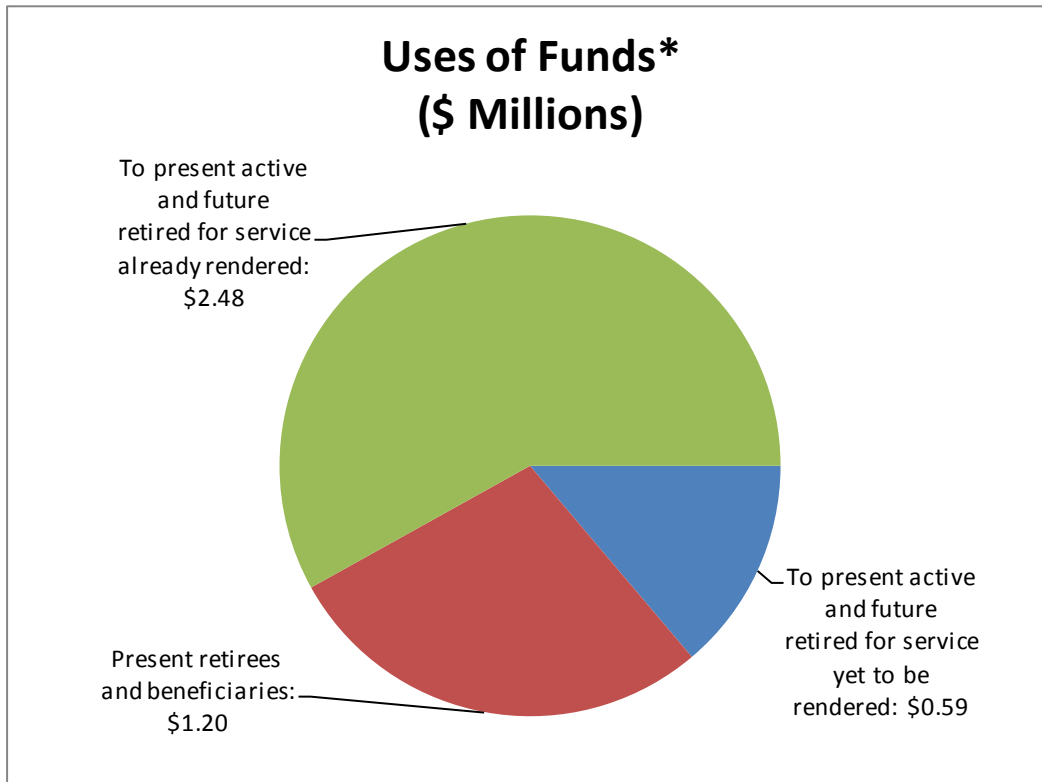
Actuarial Present Value of Expected Future Death Benefit Payments

| | |
|----------------------------------------------------------------------------------------|-------------|
| A. To retirees and beneficiaries: | |
| 1. Death Benefits | \$1,203,723 |
| 2. Reserve | 0 |
| 3. Total | 1,203,723 |
| B. To vested terminated members: | 0 |
| C. To present active members: | |
| 1. Allocated to service rendered prior to valuation date - actuarial accrued liability | 2,483,511 |
| 2. Allocated to service likely to be rendered after valuation date | 589,675 |
| 3. Total | 3,073,186 |
| D. Total Actuarial Present Value of Expected Future Benefit Payments: [@] | \$4,276,909 |

[@] Excludes accrued liabilities and assets for Closed group members.

Financing Benefit Promises June 30, 2017 (Open Plan Only)

(\$4.27 Million)



* Totals may not add due to rounding.

Historical Schedule of Open Plan Results June 30, 2017 (Open Plan Only)

| Valuation Year June 30 | (1) | (2) | (3) | (4) | (5) | (6) | (7) | | (8) | (9) |
|------------------------------|--------------|------------------------------------|---------------------------------------|--------------------------------|-----------------------------------|-----------------------------------|--------------------------------|------------------------------|----------------------------|--------------------------------|
| | MVA | Funding Valuation Adjustment | Present Value of Future Retiree | Funding Valuation Assets | Actuarial Accrued Liability | Actuarial Accrued Liability | Funding Valuation Assets | Market Value of Assets | Fiscal Year June 30, | Per Active Employer Rate |
| | | | | (1) + (2) + (3) | | (5)-(4) Unfunded | (4)/(5) | (1)/(5) | | |
| 2015 | \$ 3,706,850 | \$ 51,896 | \$ 49,559 | \$ 3,808,305 | \$ 3,558,464 | \$ (249,841) | 107% | 104% | 2017 | 14.02 |
| 2016 | 3,701,238 | 251,684 | 49,471 | 4,002,393 | 3,292,916 | (709,477) | 122% | 112% | 2018 | 13.96 |
| 2017 | 3,893,653 | 70,086 | 54,326 | 4,018,065 | 3,687,234 | (330,831) | 109% | 106% | 2019 | 13.92 |

Comments

Comment A – Experience

Activity during the year for the Open Plan was less favorable than expected resulting in an experience loss of approximately \$509 thousand (or 15% of beginning of year liabilities) for the Open Plan. The primary sources of the experience loss were data-related, including rehires with more than 1 year of service and an increase in active members. These losses were augmented by investment losses. The allocation of administrative expenses amplified the asset loss on the open plan. Employer contributions were noticeably lower than expected. Employer contributions were approximately 85% of expected in the last two fiscal years. Failure to receive timely contributions in the amount per the Ordinance or Board policy could rapidly decrease the funded status of the Plan.

Comment B – Assumptions

There have been no assumption changes since the June 30, 2015 Employee's Death Benefit valuation.

Comment C – Methods

This valuation was conducted assuming that the Open Plan would continue to receive employer contributions.

The contributions provided in the City Ordinance are currently greater than necessary to fund benefits for the Open Plan, based on the current assumptions.

Comment D – Future Outlook

Both the Open and Closed Groups are over 100% funded (see Comment F for a discussion of the Closed Plan Funded Status). The Open Plan funding value of assets exceeds the market value of assets by \$70 thousand due to investment activity less than assumed in 2016. As the loss from 2016 is recognized during FY 2018, there will be downward pressure on the funded status of the plan.

Comment E – Active Members

Because potential active death benefits are so large compared to post retirement death benefits (potential active death benefits account for approximately 40% of the total normal cost), large changes in active member counts can result in large changes in the funded status. The table below shows how these two statistics compare:

| <u>Valuation Date</u> | <u>6/30/2015</u> | <u>6/30/2016</u> | <u>6/30/2017</u> |
|------------------------|------------------|------------------|------------------|
| Active Members Covered | 7,465 | 6,718 | 7,640 |
| Funded Ratio | 107.0% | 121.5% | 109.0% |

If there is a large growth in the covered active membership in future valuations, there will be downward pressure on the funded status of the Plan, especially if that growth comes from re-hires (members with past service).

Comments

Comment F – Closed Plan

Based on the census data reported for the June 30, 2017 valuation, we have estimated the funded status of the closed plan as follows:

| <u>June 30, 2017</u> | <u>Closed Plan</u> |
|----------------------------------------|------------------------|
| Return Assumption | <u>4.29%</u> |
| Actuarial Accrued Liabilities | \$ 19,942,241 |
| Expected Future Retiree Contributions | (124,969) |
| Reported Market Value of Assets | <u>\$ (21,462,682)</u> |
| Unfunded Actuarial Accrued Liabilities | \$ (1,645,410) |
| Funded Status | 108.30% |

An investment return assumption of 4.29% was used to develop the schedule above since it is the assumption adopted by the Board for purposes of the cash-out option. If the Board would like to see the results based on a different rate, please let us know and we can perform such supplemental calculations. The cash-out option is reflected in the amounts above.

Note, the plan provisions of the open and closed plans are the same. However, there are no active members in the closed plan. Benefits are payable to closed plan members only to the extent that assets are available.

Comment G – Open Plan Funded Status

The Open Plan is currently 109% funded using the actuarial value of assets (and including the present value of future retired member contributions). The Open Plan is 106% funded using the market value of assets (excluding the present value of future retired member contributions). The funded status of the Plan is appropriate for assessing the need for future contributions for benefits attributable to past service if all assumptions are met. This funded status is not an appropriate measure of the Plan's future need for contributions attributable to service rendered after the valuation date or to measure the estimated settlement costs.

Other Observations

General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.00% on the actuarial value of assets), it is expected that:

- 1) The funded status of the plan will remain above a 100% funded ratio.
- 2) The employer contributions called for in the Ordinance will continue to exceed the actuarially determined employer contribution.

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. With regard to any funded status measurements presented in this report:

- 1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, in other words, of transferring the obligations to an unrelated third party in an arm's length market value type transaction.
- 2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit). Board policy is to develop an employer contribution that is the larger of 1) the per active person rate in the ordinance; or 2) the per active person rate necessary to pay normal cost plus a UAAL payment based on a 30-year amortization period.

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 to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.

Risks to Future Employer Contribution Requirements

There are ongoing risks to future employer contribution requirements to which the Retirement System is exposed, such as:

- Actual and Assumed Investment Rate of Return
- Actual and Assumed Mortality Rates
- Amortization Policy
- Changing Active Member Count

Experience Gain (Loss) Analysis June 30, 2017

| | |
|------------------------------------------------------------------------------|---------------------|
| (1) UAAL* beginning of year | \$ (709,477) |
| (2) Normal cost | 90,559 |
| (3) Contributions made | 168,860 |
| (4) Interest accrual: $0.07 \times [(1) + 1/2 [(2) - (3)]]$ | (52,404) |
| (5) Expected UAAL before changes: (1) + (2) - (3) + (4) | (840,182) |
| (6) Effect of assumption/method changes | 0 |
| (7) Effect of plan changes | 0 |
| (8) Expected UAAL after changes: (5) + (6) + (7) | (840,182) |
| (9) Actual UAAL end of year | (330,831) |
| (10) Gain/(Loss): (8) - (9) | \$ (509,351) |
| (10a) Portion of gain/(loss) due to investments | (201,216) |
| (10b) Portion of gain/(loss) due to liabilities | (308,135) |
| (11) Total Gain/(Loss) as a percent of beginning of year accrued liabilities | (15.5%) |

* *Unfunded Actuarial Accrued Liability.*

| Type of Risk Area | Gain (Loss) in Period # | |
|---------------------------------------------------|-------------------------|---------------------------------------------|
| | Totals | Percent of Beginning of Year Liabilities |
| Investment Return | \$ (201,216) | 39.5 % |
| New Hires with more than 1 year of service | (204,791) | 40.2 % |
| New Hires with 1 or less years of service | (30,372) | 6.0 % |
| Other Data Adjustments * | (274,158) | 53.8 % |
| Benefits Paid in excess of expected | (96,036) | 18.9 % |
| Demographic Risk Areas: | | |
| Full and Reduced Service Retirements | \$ (10,522) | 2.1 % |
| Death Benefits | 96,136 | (18.9)% |
| Disability Benefits | 3,949 | (0.8)% |
| Other Terminations | 165,686 | (32.5)% |
| Active Totals | \$ 255,249 | (50.1)% |
| Post-Retirement Mortality | 41,972 | (8.2)% |
| Total Gain (or Loss) During Period | \$ (509,351) | 100.0 % |

Results are approximate due to limitations in data.

* *Related to data audits and more precise reporting by the System.*

SECTION B

DATA USED IN VALUATION

Summary of Benefit Provisions and Contributions June 30, 2017 (Open Plan Only)

| Group | Amounts |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| Active Members | |
| Lump Sum Death Benefit: | |
| While Active | |
| - Police & Fire (Lieutenants and Sergeants Association (LSA) & Fire equivalents) | \$10,000 |
| - Police & Fire (All Others) | \$ 4,900 |
| - Civilian members | \$10,000 |
| After Retirement: | |
| With 8-10 years service | \$1,860 |
| With 10 or more years service | \$1,860 plus \$93 per year of service in excess of 10 years |
| Contributions: | |
| Members (non-refundable) | \$10.40/year* |
| Employer | \$13.30/year* |
| Retired Employees | |
| Lump Sum Death Benefit: | \$1,860 plus \$93 per year of service in excess of 10 years |
| Contributions: | |
| Retired members | \$1.08/year |
| Employer | None |
| Other | |
| <p>People in the Deferred Retirement Option Plan (DROP) are treated like any other retired member for purposes of this plan.</p> <p>People who terminate active service prior to retirement are not normally eligible for plan benefits. We understand that there are exceptions to this rule for former police officers and firefighters. We have made no adjustment to the valuation for exceptions.</p> | |

* Contributions for Police Lieutenants and Sergeants and Fire equivalents (approximately 643 members) are \$13.00/yr. for members and \$20.70/yr. for City.

Comparative Statement Open Plan Only

| June 30 | Covered Members | | | | Fiscal Year June 30 | Active Member & Employer Contributions | |
|---------|-----------------|---------------|-------|---------|------------------------|----------------------------------------|---------|
| | Active | | | Retired | | Greater of Ordinance or Computed | Actual@ |
| | General | Police & Fire | Total | | | | |
| 2014#^ | 4,757 | 3,183 | 7,940 | 0 | 2016 | 24.83 | 21.85 |
| 2015# | 4,981 | 2,484 | 7,465 | 749 | 2017 | 24.68 | 25.14 |
| 2016 | 4,235 | 2,483 | 6,718 | 1,239 | 2018 | 24.59 | |
| 2017 | 5,117 | 2,523 | 7,640 | 1,665 | 2019 | 24.54 | |

After revised actuarial assumptions or methods.

@ Weighted average based on actual contributions and beginning of fiscal year head count.

^ Excludes 174 actives retired by 12/31/2014 and 16,857 retirees transferred to Closed Plan. Plan is bifurcated effective 12/10/2014.

Schedule of Employer Contributions

| Year Ending June 30 | Estimated | Actual | Excess/ (Shortfall) | Actual/ Expected |
|---------------------|------------|-----------|---------------------|------------------|
| 2016 | \$ 112,272 | \$ 95,213 | \$ (17,059) | 85% |
| 2017 | 104,659 | 88,709 | (15,950) | 85% |
| 2018 | 93,797 | | | |
| 2019 | 106,370 | | | |

Demographic Information Open Plan Only

Active Age and Service Schedule

| Attained Age | Years of Service to Valuation Date | | | | | | | Totals |
|-----------------|------------------------------------|------------|------------|--------------|------------|------------|------------|--------------|
| | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30 Plus | No. |
| Under 20 | 47 | | | | | | | 47 |
| 20-24 | 386 | 1 | | | | | | 387 |
| 25-29 | 713 | 36 | 2 | | | | | 751 |
| 30-34 | 471 | 119 | 38 | 3 | | | | 631 |
| 35-39 | 350 | 98 | 133 | 207 | 6 | | | 794 |
| 40-44 | 278 | 89 | 125 | 412 | 132 | 2 | | 1,038 |
| 45-49 | 287 | 74 | 108 | 477 | 309 | 58 | 3 | 1,316 |
| 50-54 | 211 | 51 | 76 | 285 | 261 | 148 | 66 | 1,098 |
| 55-59 | 175 | 45 | 69 | 182 | 158 | 145 | 121 | 895 |
| 60-64 | 110 | 43 | 43 | 80 | 80 | 68 | 84 | 508 |
| 65-69 | 32 | 12 | 18 | 15 | 10 | 15 | 17 | 119 |
| 70-74 | 8 | 3 | 4 | 9 | 5 | 4 | 8 | 41 |
| 75-79 | 2 | 1 | 4 | 2 | 1 | 2 | 3 | 15 |
| Totals | 3,070 | 572 | 620 | 1,672 | 962 | 442 | 302 | 7,640 |

Demographic Information Open and Closed Groups

Retiree Age and Service Schedule (Open)

| Attained Age | Years of Service as Reported in Valuation | | | | | | | | | | | Totals |
|---------------|-------------------------------------------|-----------|------------|------------|------------|------------|-----------|-----------|-----------|-----------|----------|--------------|
| | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-50 | 50 Plus | No. |
| Under 20 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 20-24 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 25-29 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 |
| 30-34 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 35-39 | 0 | 0 | 3 | 9 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 14 |
| 40-44 | 0 | 0 | 4 | 74 | 12 | 2 | 0 | 0 | 0 | 0 | 0 | 92 |
| 45-49 | 0 | 0 | 2 | 70 | 94 | 44 | 1 | 1 | 3 | 8 | 1 | 224 |
| 50-54 | 0 | 1 | 5 | 40 | 111 | 172 | 7 | 0 | 5 | 9 | 2 | 352 |
| 55-59 | 0 | 1 | 5 | 29 | 79 | 235 | 12 | 3 | 4 | 9 | 4 | 381 |
| 60-64 | 0 | 4 | 79 | 94 | 75 | 155 | 47 | 5 | 0 | 3 | 0 | 462 |
| 65-69 | 0 | 5 | 22 | 17 | 13 | 26 | 8 | 9 | 4 | 0 | 0 | 104 |
| 70-74 | 0 | 1 | 2 | 4 | 3 | 6 | 1 | 3 | 2 | 0 | 0 | 22 |
| 75-79 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 5 |
| 80-84 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 85-89 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 90-94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 0 | 12 | 124 | 340 | 391 | 645 | 77 | 21 | 18 | 29 | 8 | 1,665 |

Retiree Age and Service Schedule (Closed)

| Attained Age | Years of Service as Reported in Valuation | | | | | | | | | | | Totals |
|---------------|-------------------------------------------|------------|--------------|--------------|--------------|--------------|--------------|------------|-----------|-----------|----------|---------------|
| | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-50 | 50 Plus | No. |
| Under 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20-24 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 |
| 25-29 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 30-34 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 35-39 | 0 | 5 | 27 | 1 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 38 |
| 40-44 | 0 | 3 | 43 | 21 | 5 | 3 | 0 | 0 | 0 | 0 | 0 | 75 |
| 45-49 | 0 | 2 | 53 | 59 | 52 | 32 | 3 | 0 | 0 | 0 | 0 | 201 |
| 50-54 | 0 | 5 | 44 | 47 | 104 | 255 | 14 | 1 | 0 | 1 | 0 | 471 |
| 55-59 | 0 | 7 | 77 | 62 | 94 | 464 | 170 | 7 | 0 | 0 | 1 | 882 |
| 60-64 | 0 | 22 | 127 | 149 | 191 | 666 | 453 | 41 | 2 | 1 | 0 | 1,652 |
| 65-69 | 0 | 31 | 240 | 250 | 254 | 897 | 652 | 151 | 12 | 1 | 0 | 2,488 |
| 70-74 | 0 | 33 | 198 | 200 | 197 | 745 | 504 | 185 | 25 | 2 | 0 | 2,089 |
| 75-79 | 0 | 31 | 109 | 124 | 129 | 385 | 291 | 89 | 10 | 4 | 1 | 1,173 |
| 80-84 | 0 | 17 | 59 | 54 | 72 | 184 | 181 | 66 | 16 | 7 | 1 | 657 |
| 85-89 | 0 | 14 | 39 | 53 | 54 | 154 | 165 | 93 | 13 | 4 | 3 | 592 |
| 90-94 | 0 | 7 | 30 | 25 | 50 | 108 | 119 | 48 | 14 | 3 | 2 | 406 |
| 95-99 | 0 | 4 | 5 | 10 | 7 | 41 | 32 | 11 | 3 | 0 | 0 | 113 |
| Totals | 0 | 181 | 1,051 | 1,055 | 1,209 | 3,941 | 2,584 | 692 | 95 | 23 | 8 | 10,839 |

Data Adjustments

Source of Data Used for This Valuation

The active member data used for this valuation is the same data that was used for the valuations of the General Retirement System and Police and Fire Retirement System pension plans. The retiree data used for this valuation is based on the data used for the General Retirement System and Police and Fire Retirement System pension plans with the following adjustments:

- Members in the retiree data listed as survivors or dependent children were not included in this valuation.
- Members that retired in 2014 or prior were valued in the closed plan only.
- A data file containing a list of closed plan members that elected to cash-out their death benefit was provided. The members in that data file were not valued in the closed plan.

Concerns and Deficiencies of the Data Used

People who terminate active service prior to retirement are not normally eligible for plan benefits. We understand that there are exceptions to this rule for former police officers and firefighters. The exceptions are not explicitly identified and we assume that all terminated members are not eligible for the death benefit. Furthermore, in the retiree data we are unable to distinguish members that terminated prior to retirement. We are, therefore, unable to exclude those members from this valuation.

We have been instructed by System staff to use bargaining unit information to determine membership in DPLSA and DPCOA. Historically, the class code was used for this purpose but it no longer applies under the new Component I pension plans. Class code information from the 2014 valuation is brought forward each year and is used to determine DPLSA and DPCOA (and Fire equivalents) membership as defined in Component II as of June 30, 2014 for purposes of the retirement assumption. In particular, for members older than 43 or with more than 17 years of service as of June 30, 2014, individuals with DPLSA and DPCOA (and Fire equivalent) class codes were assumed to be eligible for Component II 25 & Out retirement conditions and individuals with DPOA (and Fire equivalent) class codes were assumed to be eligible for Component II 20 & Out retirement conditions.

Retiree death benefits were estimated based on service. For those retirees with less than eight years of service reported we assumed the reported service was not credible (due to vesting and retirement conditions) and used 25 years of service to estimate the death benefit.

Membership

It was assumed that all active members and all retired members of the City of Detroit Retirement Systems would participate in this Plan going forward subject to the division of the Plan under the POA. It is further assumed that current vested former police officers and firefighters will decline to participate in the Plan at retirement. Beneficiaries of deceased retired and active members were excluded from this valuation.

If readers of this report have information to indicate that the data adjustments described above are not reasonable, they should immediately inform the authors and should not rely on results of the report.

Reconciliation of Raw Data

Police and Fire Retirement System Active Data

| | |
|------------------------------------------------------------------------------|--------------|
| Number used in the June 30, 2017 pension valuation | 2,523 |
| Excluded | - |
| Added | - |
| Number of records valued in the June 30, 2017 Employees Death Benefit report | <u>2,523</u> |

General Retirement System Active Data

| | |
|------------------------------------------------------------------------------|--------------|
| Number used in the June 30, 2017 pension valuation | 5,117 |
| Excluded | - |
| Added | - |
| Number of records valued in the June 30, 2017 Employees Death Benefit report | <u>5,117</u> |

Police and Fire Retirement System Retiree Data

| | |
|----------------------------------------------------------------------------------------|----------|
| Number used in the June 30, 2017 pension valuation (legacy and hybrid, including DROP) | 9,015 |
| Excluded (due to closed plan, survivor, etc.) | (9,015) |
| Added | - |
| Number of records valued in the June 30, 2017 Employees Death Benefit report | <u>-</u> |

General Retirement System Retiree Data

| | |
|------------------------------------------------------------------------------|----------|
| Number used in the June 30, 2017 pension valuation (legacy and hybrid) | 12,034 |
| Excluded (due to closed plan, survivor, etc.) | (12,034) |
| Added | - |
| Number of records valued in the June 30, 2017 Employees Death Benefit report | <u>-</u> |

Summary of Current Asset Information (Total Plan)

Assets

| | June 30, 2017 Market Value |
|--------------------------------|-------------------------------|
| Cash & Equivalents | \$ 1,425,538 |
| Bonds | 2,171,000 |
| Equities | 9,463,010 |
| Mutual Funds | 12,150,554 |
| Fund Balance | \$ 25,210,102 |
| Accounts Receivable | 146,233 |
| Total Fund Balance | \$ 25,356,335 |
| Less Est. Closed Plan Assets | (21,462,682) |
| Total Fund Balance - Open Plan | \$ 3,893,653 |

Receipts and Disbursements

| | Funding Value | |
|----------------------------------------------|----------------------|----------------------|
| | 2016-17 | 2015-16 |
| Adjustment | \$ - | \$ - |
| Balance beginning of year | \$ 26,777,466 | \$ 34,533,014 |
| Receipts | | |
| Employer Contributions - Open | \$ 88,709 | \$ 95,213 |
| Member Contributions Active/Retired | 90,451 | 82,314 |
| Investment Income | 900,838 | 1,641,644 |
| Total | \$ 1,079,998 | \$ 1,819,171 |
| Disbursements | | |
| Benefits Paid - Open | \$ 230,000 | \$ 160,000 |
| Benefits Paid - Closed | 1,685,834 | 9,306,657 |
| Other Expenses | 123,510 | 108,062 |
| Total | \$ 2,039,344 | \$ 9,574,719 |
| Total Plan Assets | \$ 25,818,120 | \$ 26,777,466 |
| Estimated Closed Plan Assets | \$ 21,854,381 | \$ 22,824,544 |
| Estimated Open Plan Assets | \$ 3,963,739 | \$ 3,952,922 |
| Ratio of Investment Return to Mean Assets | 3.0% | 5.1% |

Summary of Current Asset Information (Total Plan)

Development of Estimated Market Value of Assets

| | Market Value | | |
|----------------------------------------------|----------------------|----------------------|----------------------|
| | 2016-17 | 2015-16 | 2014-15 |
| Adjustment | \$ - | \$ - | \$ 972,972 |
| Balance beginning of year | \$ 25,079,950 | \$ 34,061,083 | \$ 35,497,019 |
| Receipts | | | |
| Employer Contributions | \$ 88,709 | \$ 95,213 | \$ 92,867 |
| Member Contributions | 90,451 | 82,314 | 96,989 |
| Recognized Investment Income | 2,136,569 | 416,059 | (193,297) |
| Total | \$ 2,315,729 | \$ 593,586 | \$ (3,441) |
| Disbursements | | | |
| Benefits paid - Active (open) | \$ 230,000 | \$ 160,000 | \$ - |
| Benefits Paid - Retired (open/closed) | 1,685,834 | 9,306,657 | 1,390,513 |
| Other Expenses | 123,510 | 108,062 | 41,982 |
| Total | \$ 2,039,344 | \$ 9,574,719 | \$ 1,432,495 |
| Total Plan Assets | \$ 25,356,335 | \$ 25,079,950 | \$ 34,061,083 |
| Estimated Closed Plan Assets | \$ 21,462,682 | \$ 21,378,712 | \$ 30,354,233 |
| Estimated Open Plan Assets | \$ 3,893,653 | \$ 3,701,238 | \$ 3,706,850 |
| Ratio of Investment Return to Mean Assets | 8.3% | 1.0% | (0.7)% |

The calculation of the split of the market value of assets estimated as of 6/30/2015 is based on: 1) \$30.4 million as of 12/31/2014 allocation to the closed plan, 2) estimated contributions and benefit payments from 12/31/2014 to 6/30/2015, and 3) calculated six month investment return. Expenses were allocated evenly between the plans and member contributions were allocated to the open group. Different allocations of these two items would produce different results but would likely not have a significant impact on the valuation.

The City provided the open and closed asset reconciliation from June 30, 2016 to June 30, 2017.

The result is shown on the next page.

Reported Allocation of Assets for Open and Closed Groups

| | <u>Open Plan</u> | <u>Closed Plan</u> | <u>Total</u> |
|-----------------------------------------------------|-------------------|---------------------|---------------------|
| Allocation of Assets as of 06/30/2016 for Valuation | \$ 3,701,238 | \$ 21,378,712 | \$ 25,079,950 |
| Receipts | | | |
| Employer Contributions | \$ 88,709 | \$ - | \$ 88,709 |
| Employee and Retiree Contributions | 80,151 | 10,300 | 90,451 |
| Investment income | 315,310 | 1,821,259 | 2,136,569 |
| Total | \$ 484,170 | \$ 1,831,559 | \$ 2,315,729 |
| Disbursements | | | |
| Estimated Benefits Paid Open | \$ 230,000 | \$ - | \$ 230,000 |
| Estimated Benefits Paid Closed | - | 1,685,834 | 1,685,834 |
| Other expenses | 61,755 | 61,755 | 123,510 |
| Total | \$ 291,755 | \$ 1,747,589 | \$ 2,039,344 |
| Allocation of Assets as of 06/30/2017 for Valuation | \$ 3,893,653 | \$ 21,462,682 | \$ 25,356,335 |

Asset information was provided by the City.

Development of Funding Value of Assets (Total Plan)

| Year Ended June 30: | 2015 | 2016 | 2017 | 2018 | 2019 |
|----------------------------------------------------------|--------------|--------------|--------------|-----------|-----------|
| A. Funding Value Beginning of Year | \$32,912,535 | \$34,533,014 | \$26,777,466 | | |
| B. Market Value End of Year | 34,061,083 | 25,079,950 | 25,356,335 | | |
| C. Market Value Beginning of Year | 34,524,047 | 34,061,083 | 25,079,950 | | |
| D. Non-Investment Net Cash Flow | (1,200,657) | (9,289,130) | (1,736,674) | | |
| E. Investment Income | | | | | |
| E1. Market Total: B - C - D | 737,693 | 307,997 | 2,013,059 | | |
| E2. Amount for Immediate Recognition (7.0%) | 2,261,854 | 2,092,191 | 1,813,639 | | |
| E3. Amount for Phased-In Recognition: E1-E2 | (1,524,161) | (1,784,194) | 199,420 | | |
| F. Phased-In Recognition of Investment Income | | | | | |
| F1. Current Year: E3 / 3 | (508,054) | (594,731) | 66,473 | | |
| F2. First Prior Year | 544,176 | (508,054) | (594,731) | \$ 66,473 | |
| F3. Second Prior Year | 523,160 | 544,176 | (508,053) | (594,732) | \$ 66,474 |
| F4. Total Recognized Investment Gain | 559,282 | (558,609) | (1,036,311) | (528,259) | 66,474 |
| G. Funding Value End of Year: A + D + E2 + F4 | 34,533,014 | 26,777,466 | 25,818,120 | | |
| H. Difference between Market & Funding Value | (471,931) | (1,697,516) | (461,785) | | |
| I. Recognized Rate of Return | 8.73% | 5.13% | 3.00% | | |
| J. Market Value Rate of Return* | 2.17% | 1.05% | 8.31% | | |
| K. Ratio of Funding Value to Market Value: G / B | 101.4% | 106.8% | 101.8% | | |
| L. Estimated June 30 Market Value of Open Plan | 3,706,850 | 3,701,238 | 3,893,653 | | |
| M. Funding Value of Open Plan: K * L | 3,758,746 | 3,952,922 | 3,963,739 | | |
| N. Difference in Open Plan Market & Funding Value: L - M | (51,896) | (251,684) | (70,086) | | |

* Treats 6/30/2015 beginning of year adjustment of \$972,972 as 2015 plan year investment income. The market rate of return would be (0.7)%, if the beginning of year adjustment was treated as a prior period adjustment.

The Funding Value of Assets recognizes assumed investment income (line E2) fully each year. Differences between actual and assumed investment income (line E3) are phased-in over a closed three-year period. During periods when investment performance exceeds the assumed rate, Funding Value of Assets will tend to be less than Market Value. During periods when investment performance is less than the assumed rate, Funding Value of Assets will tend to be greater than Market Value. The Funding Value of Assets is unbiased with respect to Market Value. At any time, it may be either greater or less than Market Value. If actual and assumed rates of retirement income are exactly equal for two consecutive years, the Funding Value will become equal to Market Value.

SECTION C

SUMMARY OF VALUATION METHODS AND ASSUMPTIONS

Actuarial Cost Method

Normal cost and the allocation of benefit values between service rendered before and after the valuation date was determined using an individual **entry-age normal cost** valuation method having the following characteristics:

- (i) the annual normal costs for each individual active member, payable from the date of employment to the earlier of date of DROP or date of retirement, are sufficient to accumulate the value of the employer provided benefit at the time of retirement or death-in-service; and
- (ii) each annual normal cost is a level dollar amount.

Financing of Unfunded Actuarial Accrued Liabilities. Unfunded actuarial accrued liabilities were amortized as a level dollar amount (see page A-3) over a 30-year period.

A reserve for claims incurred but not reported (IBNR) of \$9,500 was added to the computed accrued liabilities for the Open Plan. This reserve is approximately three months of expected claims.

A reserve for claims incurred but not reported (IBNR) of \$0 was added to the computed accrued liabilities for the Closed Plan.

The present value of future retiree contributions includes all retiree contributions expected to be paid in the future on behalf of the current retirees and current active members.

Actuarial Value of Assets is based on three-year smoothed, market related value. Each year the funding value recognizes (1) non-investment cash flow, (2) the assumed investment income, and (3) one-third of the difference between assumed investment income and actual investment income for the current year and previous two years.

Actuarial Assumptions Used for the Valuation

The actuary calculates the contribution requirements and benefit values of the Plan by applying actuarial assumptions adopted by the Board to the benefit provisions and people information furnished, using the actuarial cost methods described on the previous page.

The principal areas of financial risk which require assumptions about future experience are:

- long-term rates of investment return
- rates of mortality among members, retirees and beneficiaries
- rates of withdrawal from active membership
- rates of disability among members
- the age patterns of service retirements

In a valuation, the actuary calculates the monetary effect of each assumption for as long as a present covered person survives - - a period of time which can be as long as a century.

Actual experience of the Plan will not coincide exactly with assumed experience, regardless of the assumptions and the precision of the many calculations made. Each valuation provides a complete recalculation of assumed future experience and takes into account all past differences between assumed and actual experience. The result is a continual series of adjustments (usually small) to the computed contribution rate.

From time to time it becomes appropriate to modify one or more of the assumptions to reflect experience trends (but not random year to year fluctuations). Methods and assumptions were last updated for the June 30, 2015 actuarial valuation.

All assumptions are adopted by the Board. The rationale for the mortality base table assumptions is the 2008-2013 Retired Mortality Experience Study issued to the respective Pension Boards. There is no assumption for future mortality improvement in this valuation for conservatism. The rationale for the other demographic assumptions is the 2002-2007 Experience Study issued to the respective Pension Boards unless otherwise stated. Based on our capital market assumption modeler, we believe the 7.00% investment return assumptions are reasonable. All assumptions are expectations of future experience, not market measures.

Actuarial Assumptions Used for the Valuation

The rate of investment return was 7.0% a year, net of expenses, compounded annually. This assumption is used to make money payable at one point in time equal in value to a different amount of money payable at another point in time.

The mortality table used in evaluating death benefits to be paid to retired members in the General Retirement System was 100% of the RP-2014 Blue Collar Annuitant Table set-forward 1 year for males and 100% of the RP-2014 Blue Collar Annuitant Table set-forward 1 year for females. For Police and Fire, the mortality tables used in evaluating death benefits to be paid to retired members was 100% of the RP-2014 Blue Collar Annuitant Table with no set-forward for males or females. Tables were extended below age 50 with a cubic spline to the published Juvenile rates. This table contains no margin for future improvements in life expectancies for conservatism in this valuation. Sample values are shown below:

| Sample Attained Ages | General, EMS, & DOT % Dying within Next Year | | | | Police & Fire % Dying within Next Year | | | |
|----------------------|-------------------------------------------------|-------|----------|-------|-------------------------------------------|-------|----------|-------|
| | Healthy | | Disabled | | Healthy | | Disabled | |
| | Men | Women | Men | Women | Men | Women | Men | Women |
| 50 | 0.44% | 0.30% | 0.44% | 0.30% | 0.41% | 0.28% | 0.41% | 0.28% |
| 55 | 0.64% | 0.43% | 0.64% | 0.43% | 0.60% | 0.40% | 0.60% | 0.40% |
| 60 | 0.91% | 0.62% | 0.91% | 0.62% | 0.85% | 0.57% | 0.85% | 0.57% |
| 65 | 1.38% | 0.96% | 1.38% | 0.96% | 1.26% | 0.87% | 1.26% | 0.87% |
| 70 | 2.16% | 1.54% | 2.16% | 1.54% | 1.97% | 1.40% | 1.97% | 1.40% |
| 75 | 3.47% | 2.54% | 3.47% | 2.54% | 3.15% | 2.30% | 3.15% | 2.30% |
| 80 | 5.74% | 4.24% | 5.74% | 4.24% | 5.19% | 3.82% | 5.19% | 3.82% |

Pre-retirement mortality is based on the corresponding Employee tables. Sample values are shown below:

| Sample Attained Ages | General, EMS, & DOT % of Active Members Dying within Next Year | | | | Police & Fire % of Active Members Dying within Next Year | | | |
|----------------------|----------------------------------------------------------------------|-------|------------|-------|----------------------------------------------------------------|-------|------------|-------|
| | Non-Duty Death | | Duty Death | | Non-Duty Death | | Duty Death | |
| | Men | Women | Men | Women | Men | Women | Men | Women |
| 20 | 0.04% | 0.01% | 0.01% | 0.00% | 0.03% | 0.01% | 0.03% | 0.01% |
| 25 | 0.04% | 0.02% | 0.01% | 0.01% | 0.03% | 0.01% | 0.03% | 0.01% |
| 30 | 0.04% | 0.02% | 0.01% | 0.01% | 0.03% | 0.01% | 0.03% | 0.01% |
| 35 | 0.05% | 0.03% | 0.02% | 0.01% | 0.03% | 0.02% | 0.03% | 0.02% |
| 40 | 0.07% | 0.04% | 0.02% | 0.01% | 0.04% | 0.02% | 0.04% | 0.02% |
| 45 | 0.11% | 0.06% | 0.04% | 0.02% | 0.06% | 0.04% | 0.06% | 0.04% |
| 50 | 0.18% | 0.10% | 0.06% | 0.03% | 0.11% | 0.06% | 0.11% | 0.06% |

For General, EMS, and DOT, it is assumed that 25% of deaths before retirement are duty related. For Police and Fire, it is assumed that 50% of deaths before retirement are duty related.

Actuarial Assumptions Used for the Valuation

The rates of retirement used to measure the probability of eligible members retiring during the next year were as follows:

Probabilities of Age/Service Retirement for General Members with More Than 20 Years of Eligibility Service and Eligible to Retire in Component II Before Age 60 on June 30, 2014

| Retirement Ages | Percent of Eligible Active Members Retiring within Next Year | | |
|--------------------|-----------------------------------------------------------------|---------|------|
| | EMS | General | DOT |
| 45 | 25% | | |
| 46 | 25% | | |
| 47 | 25% | | |
| 48 | 22% | | |
| 49 | 20% | | |
| 50 | 18% | 50% | 55% |
| 51 | 15% | 50% | 50% |
| 52 | 15% | 45% | 50% |
| 53 | 15% | 45% | 50% |
| 54 | 15% | 40% | 55% |
| 55 | 15% | 30% | 50% |
| 56 | 15% | 30% | 50% |
| 57 | 15% | 30% | 50% |
| 58 | 15% | 30% | 50% |
| 59 | 15% | 40% | 55% |
| 60 | 40% | 25% | 40% |
| 61 | 30% | 25% | 30% |
| 62 | 30% | 25% | 30% |
| 63 | 30% | 25% | 30% |
| 64 | 30% | 25% | 30% |
| 65 | 30% | 35% | 30% |
| 66 | 30% | 30% | 30% |
| 67 | 30% | 25% | 30% |
| 68 | 30% | 25% | 50% |
| 69 | 30% | 25% | 50% |
| 70 | 100% | 20% | 100% |
| 71 | | 20% | |
| 72 | | 20% | |
| 73 | | 20% | |
| 74 | | 20% | |
| 75 | | 20% | |
| 76 | | 20% | |
| 77 | | 20% | |
| 78 | | 20% | |
| 79 | | 20% | |
| 80 | | 100% | |

Members eligible to retire under Component II as described above are assumed to defer any Component I vested benefits until normal retirement age.

Note that the groups detailed above have different eligibility conditions under Component II.

The rationale for the retirement probabilities is the 2002-2007 Experience Study modified to account for the different eligibility in Component I and split to estimate which eligibility (Component I or Component II) would influence members based on the relative service under each component.

Actuarial Assumptions Used for the Valuation

Rates of Retirement (Continued)

Probabilities of Age/Service Retirement for General Members With Less Than 20 Years of Eligibility Service or not Eligible to Retire in Component II Before age 60 on June 30, 2014

| Retirement Ages | Percent of Eligible Active Members Retiring within Next Year | |
|--------------------|-----------------------------------------------------------------|---------|
| | EMS/DOT | General |
| 62 | 40% | 30% |
| 63 | 40% | 30% |
| 64 | 40% | 30% |
| 65 | 40% | 30% |
| 66 | 40% | 30% |
| 67 | 40% | 30% |
| 68 | 40% | 30% |
| 69 | 40% | 30% |
| 70 | | 30% |
| 71 | | 30% |
| 72 | | 30% |
| 73 | | 30% |
| 74 | | 30% |
| 75 | | 30% |
| 76 | | 30% |
| 77 | | 30% |
| 78 | | 30% |
| 79 | | 30% |
| 80 | | 100% |

The rationale for the retirement probabilities is the 2002-2007 Experience Study modified to account for the different eligibility in Component I and split to estimate which eligibility (Component I or Component II) would influence members based on the relative service under each component.

Actuarial Assumptions Used for the Valuation

Rates of Retirement (Continued)

Rates of Early Retirement for General Employees

| Percent of Eligible Active Members Retiring Early within Next Year | |
|--------------------------------------------------------------------|---------|
| Retirement Ages | General |
| 55 | 7% |
| 56 | 8% |
| 57 | 9% |
| 58 | 10% |
| 59 | 12% |
| 60 | 12% |
| 61 | 12% |
| 62 | 12% |
| 63 | 12% |
| 64 | 12% |

Probabilities of Service Retirement for Police and Fire Members Older Than Age 43 or with 17 or More Years of Credited Service (Including Prior Service) as of June 30, 2014

25 & Out Retirement Eligibility

| Percent of Eligible Active Members Entering DROP within Next Year | | |
|-------------------------------------------------------------------|--------|------|
| Years of Service | Police | Fire |
| 24 | 40% | 40% |
| 25 | 40% | 40% |
| 26 | 40% | 40% |
| 27 | 40% | 40% |
| 28 | 40% | 40% |
| 29 | 100% | 100% |

20 & Out Retirement Eligibility (DPOA & Fire Equivalent)

| Percent of Eligible Active Members Entering DROP within Next Year | | |
|-------------------------------------------------------------------|--------|------|
| Years of Service | Police | Fire |
| 19 | 40% | 40% |
| 20 | 40% | 40% |
| 21 | 40% | 40% |
| 22 | 40% | 40% |
| 23 | 40% | 40% |
| 24 | 100% | 100% |

The rationale for the retirement probabilities is the 2002-2007 Experience Study modified to account for the different eligibility in Component I and split to estimate which eligibility (Component I or Component II) would influence members based on the relative service under each component.

Actuarial Assumptions Used for the Valuation

Rates of Retirement (Continued)

Probabilities of Service Retirement for Police and Fire Members Age 43 or Younger and with Less Than 17 Years of Credited Service as of June 30, 2014

| Percent of Eligible Active Members Entering DROP within Next Year | | |
|----------------------------------------------------------------------|--------|------|
| Retirement Ages | Police | Fire |
| 50-54 | 30% | 20% |
| 55-59 | 30% | 20% |
| 60 | 100% | 100% |

The rationale for the retirement probabilities is the 2002-2007 Experience Study modified to account for the different eligibility in Component I and split to estimate which eligibility (Component I or Component II) would influence members based on the relative service under each component.

Police and Fire

| Percent of Eligible Active Members Retiring or Entering DROP within Next Year | | |
|----------------------------------------------------------------------------------|--------|------|
| Retirement Ages | Police | Fire |
| 60-64 | 40% | 100% |
| 65 | 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.

Actuarial Assumptions Used for the Valuation

Rates of separation from active membership were as shown below (rates do not apply to members eligible to retire and do not include separation on account of death or disability). This assumption measures the probabilities of members remaining in employment.

| Sample Ages | Years of Service | % of Active Members Withdrawing within the Next Year | | | | | |
|-------------|------------------|---------------------------------------------------------|--------|--------|--------|--------|-------|
| | | General | | EMS | DOT | Police | Fire |
| | | Men | Women | | | | |
| ALL | 0 | 18.00% | 20.00% | 11.00% | 18.00% | 8.50% | 5.00% |
| | 1 | 15.00% | 16.00% | 10.00% | 16.00% | 7.50% | 4.00% |
| | 2 | 13.00% | 14.00% | 8.00% | 14.00% | 6.00% | 3.00% |
| | 3 | 11.00% | 12.00% | 8.00% | 11.00% | 5.00% | 2.00% |
| | 4 | 10.00% | 10.00% | 7.00% | 9.00% | 4.50% | 2.00% |
| 25 | 5 & Over | 7.60% | 7.60% | 6.70% | 8.00% | 4.50% | 1.96% |
| 30 | | 7.22% | 7.22% | 5.90% | 7.60% | 3.30% | 1.62% |
| 35 | | 5.28% | 5.28% | 5.20% | 5.56% | 2.30% | 1.11% |
| 40 | | 4.05% | 4.05% | 4.40% | 4.26% | 1.70% | 0.77% |
| 45 | | 3.51% | 3.51% | 3.40% | 3.69% | 1.50% | 0.60% |
| 50 | | 3.33% | 3.33% | 2.40% | 3.50% | 1.10% | 0.51% |
| 55 | | 3.33% | 3.33% | 2.00% | 3.50% | 0.80% | 0.51% |
| 60 | 3.33% | 3.33% | 0.00% | 3.50% | 0.80% | 0.51% | |

| Sample Ages | % of Active Members Becoming Disabled within Next Year | | | | | | | |
|-------------|--------------------------------------------------------|-------|----------|-------|----------|-------|----------|-------|
| | General | | DOT | | Police | | Fire | |
| | Ordinary | Duty | Ordinary | Duty | Ordinary | Duty | Ordinary | Duty |
| 25 | 0.01% | 0.25% | 0.02% | 0.03% | 0.06% | 0.13% | 0.07% | 0.34% |
| 30 | 0.04% | 0.29% | 0.05% | 0.08% | 0.07% | 0.19% | 0.08% | 0.52% |
| 35 | 0.11% | 0.34% | 0.14% | 0.21% | 0.08% | 0.34% | 0.09% | 0.90% |
| 40 | 0.21% | 0.39% | 0.27% | 0.42% | 0.11% | 0.49% | 0.12% | 1.30% |
| 45 | 0.40% | 0.45% | 0.51% | 0.79% | 0.16% | 0.73% | 0.18% | 1.92% |
| 50 | 0.51% | 0.52% | 0.66% | 1.03% | 0.47% | 1.16% | 0.53% | 3.06% |
| 55 | 0.59% | 0.60% | 0.76% | 1.18% | 0.73% | 1.96% | 0.82% | 5.18% |
| 60 | 0.67% | 0.70% | 0.86% | 1.34% | 0.83% | 2.82% | 0.94% | 7.47% |

APPENDIX

GLOSSARY

Glossary

Actuarial Accrued Liability (AAL). 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.

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.

DFFA. Detroit Fire Fighters Association.

DOT. Department of Transportation.

DPCOA. Detroit Police Command Officers Association.

DPLSA. See LSA.

DPOA. Detroit Police Officers Association.

DROP. Deferred Retirement Option Plan.

EMS. Emergency Medical Service.

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.

Glossary

GASB. The Governmental Accounting Standards Board.

GLWA. Great Lakes Water Authority.

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.

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 (UAAL). 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.

August 24, 2018

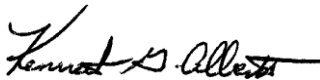
Mr. David Cetlinski
City of Detroit Employees Death Benefit Plan
500 Woodward Avenue, Suite 3000
Detroit, Michigan 48226

Dear David:

Enclosed are 30 copies of the June 30, 2017 annual actuarial valuation of the City of Detroit Employees Death Benefit Plan.

We would be happy to meet with the Governing Board to review the results of the valuation.

Sincerely,



Kenneth G. Alberts

KGA:rmn
Enclosures

cc: Ms. Gail Oxendine, City of Detroit
Ms. Kelly Tapper, City of Detroit
David T. Kausch, GRS
Judith A. Kermans, GRS

