

The General Retirement System of the City of Detroit

Annual Actuarial Valuation of Component I
As of June 30, 2018



March 21, 2019

Board of Trustees
The General Retirement System of the City of Detroit

**Re: The General Retirement System of the City of Detroit Actuarial Valuation of Component I
as of June 30, 2018**

Dear Board Members:

The results of the June 30, 2018 Annual Actuarial Valuation of Component I of the General Retirement System of the City of Detroit (DGRS) are presented in this report.

Based on our understanding, the mandated contribution rates shown on page 1 are in compliance with the Component I Plan and the City's Plan of Adjustment (POA) as approved by the Bankruptcy Court. The amount shown should not be considered a recommendation by the actuary. While a recommended level of contributions is outside the scope of the assignment, it is likely that the actuary would have recommended higher contributions than shown. Users of this report should be aware that contributions made at the POA and Plan required rate do not guarantee benefit security.

The funding level and estimated costs of the Plan shown in this report are based on the actuarial assumptions disclosed in Section F. This report includes some risk metrics on page 6, but does not include a robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment. We encourage a review and assessment of investment and other significant risks that may have a material effect on the Plan's financial condition.

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 other parties only in its entirety and only with the permission of the Board. Authorized or unauthorized use of this report by other parties does not create a liability between Gabriel, Roeder, Smith & Company and the other party.

The purpose of the valuation is to measure the System's funding progress and to provide a five-year funding projection. The five-year projection is to assist the Board with its duties related to Section 9.5 of the Combined GRS Plan. This report should not be relied on for any purpose other than the purposes described herein. Determinations of financial results, associated with the benefits described in this report, for purposes other than those identified above may be significantly different.

The findings in this report are based on data and other information through June 30, 2018. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or 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. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

This valuation assumed the continuing ability of the plan sponsor to make the contributions necessary to fund this Plan. A determination regarding whether or not the plan sponsor is actually able to do so is outside our scope of expertise and was not performed.

The valuation was based upon information furnished by the Retirement System staff, concerning Retirement System benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal reasonability and year-to-year consistency, but did not audit the information. We are not responsible for the accuracy or completeness of the information provided by the Retirement System staff. More details are provided in the data section of this report.

This report was prepared using certain assumptions as described in the section of this report entitled Methods and Assumptions. The actuarial cost method is the Entry Age Actuarial Cost Method as prescribed by Section 9.3(1) of the Combined GRS Plan. The assumed rate of return is 6.75% for valuations through June 30, 2023 as prescribed by Section 1.16(3) of the Combined GRS Plan. Except for the assumed rate of investment return, the actuarial assumptions used for the valuation are set by the Board based upon advice of the actuary and other parties. The actuarial cost method and assumed rate of investment return of 6.75% are, therefore, prescribed methods and assumptions set by another party as discussed in Actuarial Standard of Practice No. 4. In our judgment, all of the actuarial assumptions used for the valuation are reasonable for purposes of the measurement contained herein.

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. To the best of our knowledge, the information contained in this report is accurate and fairly presents the actuarial position of Component I of the General Retirement System of the City of Detroit as of the valuation date. All calculations have been made in conformity with generally accepted actuarial principles and practices and with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

David T. Kausch and Judith A. Kermans are Members of the American Academy of Actuaries (MAAA) and meet the Academy's Qualification Standards to render the actuarial opinions contained herein.

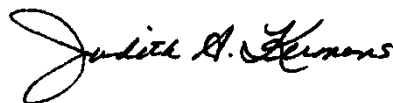
The signing individuals are independent of the plan sponsor. Gabriel, Roeder, Smith & Company will be pleased to review this valuation and report with the Board of Trustees and to answer any questions pertaining to the valuation.

Respectfully submitted,

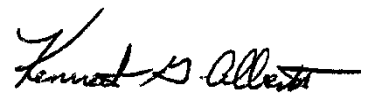
GABRIEL, ROEDER, SMITH & COMPANY



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



Judith A. Kermans, EA, FCA, MAAA



Kenneth G. Alberts



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SECTION A

INTRODUCTION

Executive Summary (\$ in Millions)

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

| Valuation Date | June 30, 2018 | June 30, 2017 |
|---|----------------|----------------|
| Contributions For Fiscal Year Ending | June 30, 2020 | June 30, 2019 |
| Employer Contributions | | |
| Mandated Percentage of Covered Payroll | 5.00 % | 5.00 % |
| Estimated Annual Amount (Mandated Contributions only) | \$ 13.5 | \$ 11.7 |
| Membership | | |
| Number of: | | |
| Active Members | 5,629 | 5,117 |
| Retirees and Beneficiaries | 247 | 200 |
| Legacy Disabled [#] | 122 | 0 |
| Inactive, Nonretired Members | 899 | 933 |
| Total | 6,897 | 6,250 |
| Valuation Payroll | \$ 263.3 | \$ 230.0 |
| Assets | | |
| Market Value (1) | \$ 95.6 | \$ 62.9 |
| Return on Market Value (net of administrative expenses) | 8.26 % | 14.08 % |
| Actuarial Information (Assuming 0.5% VPIF) | | |
| Total Normal Cost Rate | 7.63 % | 7.55 % |
| Member Contribution Rate | 4.00 % | 4.00 % |
| Employer Normal Cost Rate | 3.63 % | 3.55 % |
| Actuarial Accrued Liability (2) | \$ 136.0 | \$ 100.9 |
| Unfunded Actuarial Accrued Liability: (2) - (1) | 40.4 | 38.0 |
| Funded Ratio: (1) / (2) | 70.30 % | 62.40 % |
| Equivalent Single Amortization Period | 14 | 13 |
| Employer Rate needed for 15-Year Amortization | 4.93% | 4.85% |
| Additional Funding Information (Assuming a full 2.0% VPIF) | | |
| Employer Normal Cost Rate | 4.50 % | 4.43 % |
| Equivalent Single Amortization Period | Over 100 Years | Over 100 Years |
| Employer Rate needed for 15-Year Amortization | 6.40% | 6.27% |
| Risk Metrics (Assuming 0.5% VPIF) | | |
| Actuarial Accrued Liability Divided by Payroll | 0.5 | 0.4 |
| Market Value of Assest Divided by Payroll | 0.4 | 0.3 |

[#] See Comment 4 on page 9.

Notes: VPIF is the Variable Pension Improvement Factor or ad hoc COLA.

Please see pages 8-11 of the report for important comments regarding valuation results.

An estimate of the probability of future contributions being made was outside the scope of this project, not required by actuarial standards, and, therefore, was not made.

Development of Normal Cost and Employer Rates

| Contributions for | Contributions Expressed as a Percent of Payroll | | | | |
|---|---|----------------|----------------|----------------|----------------|
| | General City | D.O.T. | DWSD | Library | System Total |
| Normal Cost for 0.5% VPIF (COLA): | | | | | |
| Age & Service Pensions | 6.08 % | 5.61 % | 5.91 % | 5.81 % | 5.99 % |
| Disability Pensions | 0.62 % | 1.01 % | 0.66 % | 0.59 % | 0.67 % |
| Death-in-Service Pensions | 0.28 % | 0.28 % | 0.31 % | 0.24 % | 0.28 % |
| Future Refunds | 0.69 % | 0.72 % | 0.67 % | 0.71 % | 0.69 % |
| Total | 7.67 % | 7.62 % | 7.55 % | 7.35 % | 7.63 % |
| Members Current Contributions [#] | 4.00 % | 4.00 % | 4.00 % | 4.00 % | 4.00 % |
| Employer Normal Cost (0.5% VPIF) | 3.67 % | 3.62 % | 3.55 % | 3.35 % | 3.63 % |
| Additional Normal Cost for Full 2.0% VPIF ^{##} | 0.87 % | 0.83 % | 0.84 % | 0.82 % | 0.87 % |
| Employer Normal Cost (2.0% VPIF) | 4.54 % | 4.45 % | 4.39 % | 4.17 % | 4.50 % |
| Fixed Employer Rate[#] | 5.00 % | 5.00 % | 5.00 % | 5.00 % | 5.00 % |
| Amount Available for UAAL % (0.5% VPIF) | 1.33 % | 1.38 % | 1.45 % | 1.65 % | 1.37 % |
| Amount Available for UAAL % (2.0% VPIF) | 0.46 % | 0.55 % | 0.61 % | 0.83 % | 0.50 % |
| Equivalent Single Amortization Period in Years [*] | | | | | |
| 0.5% VPIF | 12 | 26 | 23 | 15 | 14 |
| 2.0% VPIF | Over 100 Years | Over 100 Years | Over 100 Years | Over 100 Years | Over 100 Years |

[#] Employer contributions are set at 5% of covered compensation per year through plan year 2023, regardless of the funded status of the Plan. Member contributions were initially set at 4.0% of payroll.

^{##} Plan provisions provide criteria for when a COLA can be paid. The current assumption is that on average, over a members retirement years, they will receive the equivalent of a 0.5% COLA (or VPIF). This is the additional amount for benefits to include a discretionary 2% simple Cost-of-Living Adjustment (COLA) beginning one year after the valuation date. See comments on pages 8-11 for additional details.

^{*} Assumes none of the employer contribution is allocated to the Rate Stabilization Fund. Assumes that no transfers from Component II for Transition Cost are made.

Development of Liabilities Retirement System Totals

Valuation Assumptions (1/2% VPIF)

| | | |
|--|-----------|-------------------|
| (1) Present Value of Future Benefits | \$ | 279,927,675 |
| (2) Present Value of Future Normal Costs | | 143,941,357 |
| (3) Actuarial Accrued Liability: (1) - (2) | \$ | 135,986,318 |
| (4) Accrued Assets | | 95,632,326 |
| (5) Unfunded Actuarial Accrued Liability (UAAL): (3) - (4) | \$ | 40,353,992 |
| (6) Additional Amount for 2% VPIF | | 15,004,943 |
| (7) UAAL for 2% VPIF: (5) + (6) | \$ | 55,358,935 |

COLA Assumption

The COLA or VPIF provided in the Plan is a 2.0% simple post-retirement increase at the beginning of each plan year starting the later of: 1) July 1, 2018; 2) one year after retirement; or 3) age 62. However, Section 9.5 of the Plan imposes several limitations on when the COLA can be paid (or clawed back). Based on this section of the Plan, it is reasonable to assume that the average COLA a retired member will receive over their lifetime will be less than 2%. For purposes of this report we have assumed that the average COLA is equivalent to 0.5% (unless specified otherwise). Future Plan experience, Board policy, and Plan interpretation regarding the administration of Section 9.5 may result in changes to this assumption. If the full 2% VPIF were assumed, the present value of benefits would be \$311.3 million and the actuarial accrued liability would be \$151.0 million rather than \$136.0 million.

Transition Costs

The Transition Cost is defined in Section E-16 of the Combined Plan as the accrued liability at plan inception due to vesting and eligibility service earned prior to the Component I effective date (July 1, 2014). While Transition Costs are not isolated in the main valuation, they are used in the projections performed for Section 9.5 of the Plan. The Board has adopted a VPIF assumption of 0.0% for determining the Transition Costs. The Transition Costs have a potential source of funding separate from employer and employee contributions (see comments on page 8). However, to the extent that the potential separate source of funding does not materialize (or is not sufficient) then the Transition Costs will have to be funded by future employer and employee contributions to the Component I Plan. As of June 30, 2018, the remaining Transition Cost is \$24.2 million. This means that of the \$40.4 million UAAL shown above (under current valuation assumptions), \$16.2 million (at least) will need to be funded by future contributions (\$40.4-\$24.2).

The funded status measure is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations. The funded status is appropriate for assessing the need for future UAAL contributions if all actuarial assumptions are met.

Contributions Comparative Schedule

| Valuation Date June 30 | Mandatory Employee Contributions | Employer Contributions for | | | | | Amount for Rate Stabilization* | Contributions Effective Fiscal Year | Employer Contribution Type# |
|---------------------------|--|--|---|--|--------------------|--------------------------------------|--------------------------------------|---|-----------------------------------|
| | | Normal Cost for 0.5% VPIF (COLA) | Additional Normal Cost for Full 2.0% VPIF (COLA) | Employer Contribution in Excess of Normal Cost ^{&} | Amount for UAAL | Amount for Rate Stabilization* | | | |
| 2014 | 4.00% | 3.22% | 0.81% | 0.97% | 0.97% | 0.00% | 2014/15 | Mandated | |
| 2014 | 4.00% | 3.22% | 0.81% | 0.97% | 0.97% | 0.00% | 2015/16 | Mandated | |
| 2015 | 4.00% | 3.17% | 0.81% | 1.02% | 1.02% | 0.00% | 2016/17 | Mandated | |
| 2016 | 4.00% | 3.43% | 0.82% | 0.75% | 0.75% | 0.00% | 2017/18 | Mandated@ | |
| 2017 | 4.00% | 3.55% | 0.88% | 0.57% | 0.57% | 0.00% | 2018/19 | Mandated | |
| 2018 | 4.00% | 3.63% | 0.87% | 0.50% | TBD | TBD | 2019/20 | Mandated | |

[&] Employer Contributions are set at 5.0% of covered compensation per year until 2024.

[#] "Mandated" (Chapter 9.3(2)) if specified by Plan document and POA; "Actuarially Determined" if determined by a valuation based on Board's funding policy.

^{*} Rate Stabilization Contributions, if any, are determined by the City through 2024.

[@] The City has elected to pay an additional contribution of \$3.1 million in June 30, 2018 in an effort to improve the funding position of the System.

Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

The determination of the accrued liability and the actuarially determined contribution requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the actuarially determined contribution that result from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; 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. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the plan's future financial condition include:

1. Investment Risk – actual investment returns may differ from the expected returns;
2. Asset/Liability Mismatch Risk – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
3. Contribution Risk – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;
4. Salary and Payroll Risk – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
5. Longevity Risk – members may live longer or shorter than expected and receive pensions for a period of time other than assumed; and
6. Other Demographic Risks – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example, if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise, if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

The timely receipt of the actuarially determined contributions is critical to support the financial health of the plan. Users of this report should be aware that contributions made at the actuarially determined rate do not necessarily guarantee benefit security.

Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

| | 2018 | 2017 |
|--|-------------|-------------|
| Ratio of the market value of assets to total payroll | 0.4 | 0.3 |
| Ratio of actuarial accrued liability to payroll | 0.5 | 0.4 |
| Ratio of actives to retirees and beneficiaries | 22.8 | 25.6 |
| Ratio of net cash flow to market value of assets | 0.4 | 0.6 |
| Duration of the actuarial accrued liability | 23.1 | 23.2 |

Ratio of Market Value of Assets to Payroll

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 2.0 times the payroll, a return on assets 5% different than assumed would equal 10% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll.

Ratio of Actuarial Accrued Liability to Payroll

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100% is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time.

The ratio of liability to payroll may also be used as a measure of sensitivity of the liability. For example, if the actuarial accrued liability is 2.5 times the payroll, a change in liability 2% other than assumed would equal 5% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in liability (and also plan sponsor contributions) as a percentage of payroll.

Ratio of Actives to Retirees and Beneficiaries

A young plan with many active members and few retirees will have a high ratio of active to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

Ratio of Net Cash Flow to Market Value of Assets

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

Duration of Actuarial Accrued Liability

The duration of the actuarial accrued liability may be used to approximate the sensitivity to a 1% change in the assumed rate of return. For example, duration of 10 indicates that the liability would increase approximately 10% if the assumed rate of return was lowered 1% and a duration of 20 indicates that the liability would increase approximately 20% of the assumed rate of return was lowered 1%.

Additional Risk Assessment

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, and stress tests. We included additional risk assessments in the funding policy discussions based on the 2017 actuarial valuation. We can update those at the Board's request.

Comments

Comment 1 – Fiscal Responsibility Test

The five-year projections required under Section 9.5 of the plan (Titled Fiscal Responsibility) are shown in Section C of this report, which starts on page 16. The projections are based on the assumptions and methods adopted by the Board, as detailed on page 16. The results of the projections are shown on page 18 and indicate that the plan is projected to be 98% funded in five years. Since the projected funded status is less than 100% in five years, we believe Board action described under Section 9.5 (1) of the plan may be required. Since the projected funded status is above 80% in five years, we believe Board action described under Section 9.5 (2) of the plan may not be required. We recommend that the Board consult with legal counsel to determine which Board actions are required by the Plan. Section 9.5 is reproduced in this report on page 19 for convenience.

Comment 1a – Fiscal Responsibility Test

July 1, 2018 is the first year the Board is allowed to provide post-retirement increases to retired members who qualify under the VPIF section of the Plan (Section 6.2 Variable Pension Improvement Factor). We believe the Board has implemented a 2-year delay between the valuation date on which the projection is performed and the actions resulting from the projection. Since the projected funded status of the plan in 5 years is less than 100% under the Section 9.5 projection, we believe the Board may be precluded from granting a VPIF on July 1, 2020. We recommend the Board consult with legal counsel.

Comment 2 – Actuarial Assumptions

The assumed rate of return prescribed by the POA is 6.75%, net of investment and administrative expenses. We have reviewed the reasonableness of this assumption based on the Plan's investment policy and the capital market assumptions of eight nationally recognized investment consulting firms using our Capital Market Assumption Modeler. The analysis depends on the underlying price inflation and the rate of administrative expenses. Based on our analysis, the prescribed 6.75% rate of return is reasonable for the purpose of the measurement being taken. If the Board would like, we can prepare a separate report of our analysis.

Comment 3 – Plan Experience

Plan experience was unfavorable in the year ending June 30, 2018. The plan experienced a net loss of \$6.2 million consisting of liability loss of \$7.3 million and asset gains of \$1.1 million. The liability losses were driven in large part by significantly higher payroll than expected and the liabilities added for Legacy duty disability costs (see Comment 4). Additional information about gains and losses is shown on page 15.

New hires entering the plan were older than new hires in previous years, resulting in an increase in the average entry age. As a result, the employer normal cost increased by 0.08% of payroll. While this is not a large change, it has a leveraging effect on the amortization period and the 5-year projection results because the total employer contribution rate is fixed until FY 2024. This change had the biggest effect on the water/sewer division.

There were also a number of new plan entrants with prior service reported for this valuation. Approximately \$3 million in accrued liabilities were added as a result of new entrants with past service.

Comment 4 – Component II (Legacy) Duty-Disabilities

Our understanding of the Duty Disability provisions (as confirmed by staff) is that members on Duty Disability prior to July 1, 2014 will accrue service in the Legacy Plan until July 1, 2014 and then will accrue service in the Hybrid plan from July 1, 2014 until age 62. There are 122 members under age 62 who were reported as receiving Duty Disability benefits under the Legacy plan. However, these members were not reported under the Hybrid plan data. We created data to value their connected Hybrid benefit beginning at age 62. The accrued Hybrid liability associated with these members is \$5.3 million.

Comment 5 - Funding

Mandatory Employee contributions are initially set to 4.0% of compensation but can be increased if necessary to maintain funding levels at 100%. Employer contributions are set at 5.0% of payroll through June 30, 2023. Employer contributions are actuarially determined beginning in FY 2024 (June 30, 2022 valuation) to be the amount necessary to fund the Plan on an actuarial basis. The 5% of payroll employer contribution rate exceeds the normal cost rate of 3.63% of payroll by 1.37% of payroll (when the normal cost rate is based on the valuation assumption of 0.5% VPIF).

| | (1) | (2) | (3) | (4) | (5) |
|--|-----------|----------|---------|---------------|----------------|
| | Employer | Employer | Excess | | Amortization |
| | Normal | Rate | (2)-(1) | UAAL | Period |
| | Cost Rate | | | | |
| Valuation Assumptions (0.5% VPIF) | 3.63% | 5.00% | 1.37% | \$ 40.4 mill. | 14 |
| Full 2% VPIF | 4.50% | 5.00% | 0.50% | \$ 55.4 mill. | Over 100 Years |

The Plan anticipates another funding source for the Transition Cost portion of the UAAL. In the event that the rate of interest credited to the Annuity Savings Fund (ASF) of the Component II (Legacy) Plan is less than the rate earned by the Component II trust, a transfer of the difference in rates (applied to the Component II ASF balance) to the Component I trust may occur to help fund transition liabilities. Transfers cease after June 30, 2023. As of June 30, 2018, no such transfers have been made. For purposes of this valuation, future transfers were assumed not to occur. See comment 7 for additional information regarding expected transfers in the near future.

Employer contributions after June 30, 2023 will be actuarially determined. The Board may wish to adopt a Funding Policy for Component I separately or in conjunction with a funding policy for the Legacy Component II plan.

Comment 6 – Administrative Expenses

The results in this report assume an investment return rate of 6.75%, net of administrative expenses. For FY 2018, 60% of the General Retirement System administrative expenses were allocated (by Retirement System staff) to Component II (Legacy) and the remaining 40% was allocated to Component I (Hybrid). Administrative expenses may put downward pressure on the Component I funded status in the short term. As an indication of the magnitude, the FY 2018 Component I administrative expenses were approximately 2.3% of the Component I market value of assets as of June 30, 2018. As the asset base grows, this rate is expected to diminish.

The computation of the rate of return net of administrative expenses will, therefore, be significantly lower than the gross rate of return and may differ from investment performance measures. This effect is expected to decline over time as the trust builds up assets. Historically, the total administrative expenses as a percent of the Combined Plan (Component I and Component II) assets were approximately 30 basis points.

We estimated the rate of return during the year to be 8.3% net of administrative expenses and 11.3% gross of administrative expenses.

Comment 7 – ASF Transfers

A simple estimate of the future ASF transfers that could be made follows. As of June 30, 2018, the ASF balance totaled \$108 million. A deterministic approach would be to assume that future excess transfers of 1.50% (6.75% rate of return minus 5.25% maximum interest crediting) of ASF balances are made each year until 2023. We also assume that Component II plan members will draw down their ASF balances over the next ten years so future transfers will decline as the ASF balance does. Based on these assumptions, the expected present value of transfers from the ASF totals \$7.7 million, well short of the \$24.2 million remaining Transition Cost.

Based on the investment performance for the year ending June 30, 2017 and June 30, 2018, we expect a transfer to occur in FY 2019 and FY 2020 in excess of the 1.50% estimate above. We have estimated the FY 2019 transfer to be approximately \$6.7 million and the FY 2020 transfer to be approximately \$3.4 million. This transfer will be included in the valuation (and the 5-year projection) once it occurs. In Section C of this report, we show the potential effect of these transfers on the 5-year projection.

We recommend that the Board set up an alternate plan for funding the Transition Cost in case future transfers are not sufficient to fund the remaining Transition Cost.

Comment 8 – Normal Cost Method

The determination of the Normal Cost is dependent on the replacement life normal cost Entry Age Normal Cost method. Our understanding of the Plan's and City's objectives is to have a level total normal cost and a separately funded Transition Cost consistent with this method. Based on the current exposure draft of the Actuarial Standards of Practice, this method is appropriate for determining a Reasonable Actuarially Determined Contribution. If the final standard changes, we may need to review this method.

Comment 9 - RSF

It is our understanding of the Plan that the amount of employer contributions credited to the Rate Stabilization Fund (RSF) is at the discretion of the Employer. We have been informed that the Employer has directed that none of the Employer contributions for FY 2015 through FY 2018 be credited to the RSF.

Comment 10 – Funding Policy

We are currently working with the Board to assist them in the development of a funding policy for this plan.

Comment 11 – Experience Study

The next experience study is scheduled to begin subsequent to the June 30, 2020 valuation.

SECTION B

FUNDING RESULTS

Actuarial Liabilities as of June 30, 2018

| Actuarial Present Value of | Total Present Value | Portion Covered by Future Normal Cost Contributions | Actuarial Accrued Liabilities (1) – (2) |
|--|------------------------|--|--|
| Age and service allowances based on total service likely to be rendered by present active members | \$ 181,144,381 | \$ 87,202,036 | \$ 93,942,345 |
| Disability benefits likely to be paid to present active members | 16,708,596 | 13,281,791 | 3,426,805 |
| Death-in-service benefits likely to be paid on behalf of present active members | 7,842,060 | 5,135,064 | 2,706,996 |
| Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active members | 37,027,253 | 38,322,466 | (1,295,213) |
| Benefits attributed to voluntary member contributions | 18,854,925 | 0 | 18,854,925 |
| Reserve for Refunds Due | 0 | 0 | 0 |
| Benefits likely to be paid to vested inactive members | 8,386,339 | 0 | 8,386,339 |
| Benefits to be paid to current retirees, beneficiaries, and future beneficiaries of current retirees (including annuities) | 9,964,121 | 0 | 9,964,121 |
| Total (0.5% VPIF) | \$ 279,927,675 | \$ 143,941,357 | \$ 135,986,318 |
| Actuarial Value of Assets | \$ 95,632,326 | \$ 0 | \$ 95,632,326 |
| Liabilities to be covered by Future Contributions | \$ 184,295,349 | \$ 143,941,357 | \$ 40,353,992 |
| Additional Amount for Full (2.0%) VPIF | 31,381,838 | 16,376,895 | 15,004,943 |
| Liabilities to be covered by Future Contributions for Full VPIF | \$ 215,677,187 | \$ 160,318,252 | \$ 55,358,935 |

Actuarial Balance Sheet (0.5% VPIF)

Assets and Present Value of Expected Future Contributions

| Valuation Date (June 30): | 2018 |
|--|----------------|
| A. Present Actuarial Value of Assets | |
| 1. Net assets from System financial statements | \$ 95,632,326 |
| 2. Adjustment for Valuation Assets | 0 |
| 3. Actuarial Value of Assets | 95,632,326 |
| B. Actuarial Present Value of Expected Future Employer Contributions | |
| 1. For Normal Costs | 67,641,674 |
| 2. For Unfunded Actuarial Accrued Liability | 40,353,992 |
| 3. Total | 107,995,666 |
| C. Actuarial Present Value of Expected Future Member Contributions | 76,299,683 |
| D. Total Present and Expected Future Resources | \$ 279,927,675 |

Present Value of Expected Future Benefit Payments

| | |
|--|----------------|
| A. To Retirees and Beneficiaries (Including Annuities) | \$ 9,964,121 |
| B. To Vested Terminated Members | 8,386,339 |
| C. To Present Active Members | |
| 1. Allocated to Service Rendered Prior to Valuation Date – Actuarial Accrued Liability | 98,780,933 |
| 2. Allocated to service likely to be rendered after valuation date | 143,941,357 |
| 3. Total | 242,722,290 |
| D. Voluntary Member Contributions | 18,854,925 |
| E. Total Actuarial Present Value of Expected Future Benefit Payments | \$ 279,927,675 |

Liability by Division (\$ in thousands)

| Present Value, June 30 of | General | D.O.T. | DWSD | Library | Totals |
|--|------------------|------------------|------------------|-----------------|-------------------|
| Accrued Pension Liabilities | | | | | |
| Retirees and beneficiaries | \$ 5,194 | \$ 1,692 | \$ 2,569 | \$ 208 | \$ 9,663 |
| Inactive members future deferred pensions | 3,025 | 1,560 | 3,515 | 287 | 8,387 |
| Active members | 65,676 | 14,869 | 11,816 | 6,420 | 98,781 |
| Total accrued pension liabilities | 73,895 | 18,121 | 17,900 | 6,915 | 116,831 |
| Pension fund balances | 50,322 | 10,059 | 11,969 | 4,427 | 76,777 |
| Additional Amount for Full VPIF | 9,533 | 2,326 | 2,261 | 883 | 15,004 |
| Full VPIF accrued liability | 83,428 | 20,447 | 20,161 | 7,798 | 131,835 |
| Accrued Annuity Liabilities (Due to Voluntary Member Contributions) | | | | | |
| Retirees and beneficiaries | \$ 295 | \$ 1 | \$ 6 | \$ 0 | \$ 302 |
| Members annuities & future refunds | 10,137 | 5,865 | 2,797 | 57 | 18,856 |
| Total accrued annuity liabilities | 10,432 | 5,866 | 2,803 | 57 | 19,158 |
| Annuity fund balances | 10,137 | 5,865 | 2,797 | 57 | 18,856 |
| Unfunded accrued annuity liabilities | 295 | 1 | 6 | 0 | 302 |
| Totals | | | | | |
| Actuarial Accrued Liabilities | \$ 84,327 | \$ 23,987 | \$ 20,703 | \$ 6,972 | \$ 135,989 |
| Accrued Assets* | 60,459 | 15,924 | 14,766 | 4,484 | 95,633 |
| Funded Ratio | 71.7% | 66.4% | 71.3% | 64.3% | 70.3% |
| Unfunded Actuarial Accrued Liabilities (0.5% VPIF) | \$ 23,868 | \$ 8,063 | \$ 5,937 | \$ 2,488 | \$ 40,356 |
| Additional Amount for Full (2.0%) VPIF | 9,533 | 2,326 | 2,261 | 883 | 15,004 |
| UAAL at Full VPIF | \$ 33,401 | \$ 10,390 | \$ 8,198 | \$ 3,371 | \$ 55,359 |

*Assets are allocated by division by System Staff.

Development of Actuarial Gain or Loss (0.5% VPIF)

| | Actuarial Accrued Liability (AAL) (A) | Actuarial Value of Assets [^] (B) | Unfunded Actuarial Accrued Liability (C) = (A) - (B) |
|---|---|--|--|
| (1) Beginning of Year (BOY) | \$ 100,872,424 | \$ 62,922,324 | \$ 37,950,100 |
| (2) Total Normal Cost* | 22,664,204 | N/A | 22,664,204 |
| (3) Total Contributions | N/A | 28,814,261 | (28,814,261) |
| (4) Benefit Payments and Refunds | (2,390,592) | (2,390,592) | - |
| (5) Interest 6.75% x (1) + 6.75% x [(2) + (3) + (4)] / 2 | <u>7,493,123</u> | <u>5,139,056</u> | <u>2,354,067</u> |
| (6) Expected End of Year (1)+(2)+(3)+(4)+(5) | \$ 128,639,159 | \$ 94,485,049 | \$ 34,154,110 |
| (7) Actual End of Year | <u>135,986,318</u> | <u>95,632,326</u> | <u>40,353,992</u> |
| (8) Gain or Loss (6)-(7) | \$ (7,347,159) | \$ (1,147,277) | \$ (6,199,882) |
| | Loss | Gain | Loss |
| (9) Percent of BOY AAL (9)/(1A) | (7.28)% | (1.14)% | (6.15)% |

* Normal Cost is based on the prior valuation and includes current year voluntary member contributions.

[^] Actuarial Value of Assets equals Market Value of Assets (no asset smoothing).

| Type of Risk Area | Gain (Loss) in Period* | |
|---|----------------------------|--|
| | Totals (\$ in millions) | Percent of Beginning of Year Liabilities [#] |
| Data Improvements[^] | \$ 0.4 | 0.4 % |
| Risks Related to Assumptions | | |
| Economic Risk Areas: | | |
| Pay Increases | (4.0) | (4.0)% |
| Investment Return | 1.1 | 1.1 % |
| VPIF | 0.0 | 0.0 % |
| Demographic Risk Areas: | | |
| Full and Reduced Service Retirements | (1.5) | (1.5)% |
| Death Benefits | (0.1) | (0.1)% |
| Disability Benefits** | (5.3) | (5.3)% |
| Other Terminations | 2.9 | 2.9 % |
| Post-Retirement Mortality | 0.3 | 0.3 % |
| Other | 0.0 | 0.0 % |
| Total Gain (or Loss) During Period | (6.2) | (6.1)% |

* Results are approximate due to limitations in data.

Beginning of year liabilities were \$100.9 million.

[^] Includes \$(3.0) million due to new entrants with past service.

** Includes improvements in modeling to align with administration.

SECTION C

FIVE-YEAR FUNDED STATUS PROJECTIONS

Section 9.5, Fiscal Responsibility, of the Combined GRS Plan contains several provisions for adjusting contributions and or benefits to be determined based on a 5-year projection of the funded status of the plan. This section calls for two different funded status projection tests:

- Section 9.5(1) test for the funded status falling below 100%
- Section 9.5(2) test for the funded status falling below 80%

Section 9.5(2) specifically states that actions taken under Section 9.5(1)(a) should be reflected in the projections but that actions taken under Section 9.5(1)(b) and 9.5(1)(c) should be excluded in the projections. Section 9.5(3) specifies the interest rate to be used in the projections. Other assumptions used in the projections were adopted by the Board based on the recommendation of the Investment Committee and are summarized below:

- The five-year projections are based on the general valuation assumptions as previously adopted by the Board (e.g., inflation, mortality, retirement, withdrawal, etc.).
- The VPIF is assumed to be 0% and the Transition Cost should assume 0% VPIF and should be excluded from the projected liabilities based upon a 9-year level dollar amortization as of 2014.
- Component II ASF balances are assumed to be withdrawn as a level dollar amount over the next 10 years, however voluntary employee contributions into the Component I Annuity Savings Fund shall be assumed to continue at the historical levels as previously contributed to the Component II ASF. For Transition Cost funding purposes, the difference between the assumed rate of investment return of 6.75% and the maximum interest rate that can be credited to the ASF Accounts of 5.25% should be used for both the Component I and Component II ASF Accounts.
- The Component I assets shall include the Rate Stabilization Fund to the extent the plan is less than 100% funded.
- The Annual Actuarial Valuation for the fiscal year ending June 30, 2015 shall generate the first five-year projection. Upon receipt of the June 30, 2015 valuation, a determination shall be made whether any remedial action is required. In the event remedial action is required, such remedial action shall be effective July 1, 2017. Subsequent valuations will follow the corresponding schedule.
- The funding value of plan assets for purposes of Section 9.5 testing of the Component I plan funding level shall be based upon the market value of assets on the valuation date and projected based on an assumed 6.75% rate of return for each of the 5 years in the projection period.
- Methods and assumptions are the same for both tests.
- 5% of payroll employer contributions.
- 4% of payroll member contributions.
- Voluntary employee contributions are included in both the assets and the liabilities.

Transition Cost

Under the current actuarial cost method, members with past vesting service generate an initial liability as of June 30, 2014. This is the “Transition Cost” described in Section E-16 of the Combined GRS Plan. A separate funding source was established for the Transition Cost through 2023. The projections net the Transition Cost out of the Actuarial Accrued Liability to determine projected funded status. As directed by the Board, Projected Transition Cost is based on the 9-year level dollar amortization of the initial Transition Cost amount and the initial Transition Cost amount is based on a 0.0% VPIF. An amortization schedule of the Transition Cost follows. Note, under this method any future gains or losses related to the Transition Cost would be accounted for in the Actuarial Accrued Liability net of Transition Cost as they occur.

Transition Cost Amortization Schedule

**Calculated Using a Level Dollar Amortization (mid-year payments)
and an Investment Return Assumption of 6.75% Compounded Annually
9-Year Closed Amortization (based on 0.0% VPIF)**

| Valuation Date June 30 | Fiscal Year June 30 | Transition Cost at Beginning of Year | Annual Contributions | | Transition Cost at End of Year |
|---------------------------|------------------------|---|-------------------------------|----|-----------------------------------|
| | | | During Fiscal Year Dollars | | |
| 2014 | 2015 | \$ 38,679,331 | \$ 5,685,036 | \$ | 35,416,412 |
| 2015 | 2016 | 35,416,412 | 5,685,036 | | 31,933,247 |
| 2016 | 2017 | 31,933,247 | 5,685,036 | | 28,214,968 |
| 2017 | 2018 | 28,214,968 | 5,685,036 | | 24,245,704 |
| 2018 | 2019 | 24,245,704 | 5,685,036 | | 20,008,516 |
| 2019 | 2020 | 20,008,516 | 5,685,036 | | 15,485,318 |
| 2020 | 2021 | 15,485,318 | 5,685,036 | | 10,656,803 |
| 2021 | 2022 | 10,656,803 | 5,685,036 | | 5,502,364 |
| 2022 | 2023 | 5,502,364 | 5,685,036 | | 0 |

To the extent that actual funding of the Transition Cost differs from this schedule, gains and losses will accumulate in the Plan’s unfunded actuarial accrued liability.

Projected Funded Status

5-Year Projection Assuming 6.75% Investment Return in all Future Years - No (0%) VPIF (COLA)

| Valuation Date | Fiscal Year | A | B | C = (A - B) | D | E = (D/C) |
|----------------|-------------|----------------|-----------------|----------------|---------------|------------------|
| June 30, | June 30, | Total AAL | Transition Cost | Net AAL | Assets | Net Funded Ratio |
| 2018 | 2019 | \$ 130,986,487 | \$ 24,245,704 | \$ 106,740,783 | \$ 95,632,326 | 90% |
| 2019 | 2020 | 163,353,733 | 20,008,516 | 143,345,217 | 132,686,300 | 93% |
| 2020 | 2021 | 197,326,158 | 15,485,318 | 181,840,841 | 171,763,104 | 94% |
| 2021 | 2022 | 233,212,005 | 10,656,803 | 222,555,202 | 213,197,164 | 96% |
| 2022 | 2023 | 271,331,846 | 5,502,364 | 265,829,482 | 257,338,574 | 97% |
| 2023 | 2024 | 311,769,022 | - | 311,769,022 | 304,303,698 | 98% |

Comment 1: Based on this projection, the Funded Status is below 100% by the end of the 5-year projection. **We believe this result means Board action under Section 9.5(1)(a), 9.5(1)(b), and 9.5(1)(c) is required.** We recommend the Board consult with legal counsel to confirm.

Comment 2: Based on this projection, the Funded Status is at or above 80% by the end of the 5-year projection. **We believe this result means the Board actions under Section 9.5(2) are not required.** We recommend the Board consult with legal counsel to confirm.

Comment 3: Based on the investment performance for the year ending June 30, 2017 and June 30, 2018, we have estimated the transfer to fund Transition Costs to be approximately \$9.9 million (2018 dollars). The actual transfer will be reflected in the above projection once it is reported in the assets (actually transferred). For illustrative purposes, below we show what the 5-year projection would look like if the combined fiscal year 2019 and 2020 ASF transfers were \$9.9 million and transfers for fiscal years thereafter were based on a 6.75% investment return.

Illustrative with Estimated FY19 and FY20 Transfers Based on FY17 and FY18 Actual Investment Returns 5-Year Projection Assuming 6.75% Investment Return in all Future Years - No (0%) VPIF (COLA)

| Valuation Date | Fiscal Year | A | B | C = (A - B) | D | E = (D/C) |
|----------------|-------------|----------------|-----------------|----------------|---------------|------------------|
| June 30, | June 30, | Total AAL | Transition Cost | Net AAL | Assets | Net Funded Ratio |
| 2018 | 2019 | \$ 130,986,487 | \$ 24,245,704 | \$ 106,740,783 | \$ 95,632,326 | 90% |
| 2019 | 2020 | 163,353,733 | 20,008,516 | 143,345,217 | 137,951,244 | 96% |
| 2020 | 2021 | 197,326,158 | 15,485,318 | 181,840,841 | 179,334,240 | 99% |
| 2021 | 2022 | 233,212,005 | 10,656,803 | 222,555,202 | 221,279,352 | 99% |
| 2022 | 2023 | 271,331,846 | 5,502,364 | 265,829,482 | 265,966,309 | 100% |
| 2023 | 2024 | 311,769,022 | - | 311,769,022 | 313,513,806 | 101% |

It is important to note that the projection at the top of the page is the official projection based on current policy. In addition, the computations of the actual transfers are expected to be performed by the System and may be different than we have estimated for the illustration.

Section 9.5 in its entirety is shown below:

Sec. 9.5. Fiscal Responsibility: Increased Funding Obligations and Benefit Reductions

- (1) To safeguard the long-term actuarial and financial integrity of the Retirement System, in the event the funding level of Component I of the Retirement System projected over a five-year period falls below one hundred percent (100%), the following remedial action shall be required in the order set forth below, beginning with the Plan Year following the Plan Year in which such determination is made and continuing until the funding level is restored to not less than one hundred percent (100%):
 - (a) the Trustee may not award the variable pension improvement factor (escalator) described in Section 6.2 to any Retiree;
 - (b) all amounts credited to the Rate Stabilization Fund shall be transferred to the Pension Accumulation Fund for the purposes of funding benefits payable under Component I of the Retirement System; and
 - (c) Member Mandatory Employee Contributions shall be increased from four percent (4%) of Compensation to five percent (5%) of Compensation for up to the next following five Plan Years.

- (2) In the event the funding level of Component I of the Retirement System determined as provided in Section 9.5(1) is projected to fall below eighty percent (80%), the following remedial action shall be required in the order set forth below, beginning with the Plan Year following the Plan Year in which such determination is made and continuing until the funding level is projected to be not less than eighty percent (80%) on a market value basis within the next five years:
 - (a) the remedial action required in Section 9.5(1) shall be implemented or continued;
 - (b) the Retirement Allowance payable to a Retiree shall not include the variable pension improvement factor (escalator) that was most recently added to the Retiree's Retirement Allowance for a Plan Year;
 - (c) Member Mandatory Employee Contributions shall be increased from five percent (5%) of Compensation to six percent (6%) of Compensation for up to the next following five Plan Years;
 - (d) the Retirement Allowance payable to a Retiree shall not include the variable pension improvement factor (escalator) that was most recently added to the Retiree's Retirement Allowance for the Plan Year preceding the Plan Year referenced in paragraph (b) above; and
 - (e) the Retirement Allowance accrued by Members for up to the next five Plan-Year period shall be determined as provided in Section 6.1, except that one percent (1 %) shall be substituted for one and one-half percent (1.5%) wherever it appears in said Section 6.1.

In determining whether the eighty percent (80%) funding level under this Section 9.5(2) has been achieved, the Plan's Actuary shall calculate the funding percentage of the Retirement System after taking into account the elimination of the variable pension improvement factor (escalator) pursuant to Section 9.5(1)(a) but prior to taking into account the remedial steps provided in Sections 9.5(1)(b) and (c).

- (3) For purposes of this Section 9.5, the "funding level" of Component I of the Retirement System shall mean the ratio of the market value of the assets of Component I of the Retirement System to the actuarial accrued liability of Component I of the Retirement System. The actuarial accrued liability shall be calculated by the Plan's Actuary utilizing an interest rate assumption of six and three-quarters percent (6.75%) and other reasonable assumptions as directed by the Board upon the recommendation of the Investment Committee. The market value of assets shall be determined on the basis of a three-year look back period of smoothed investment returns.

SECTION D

FUND ASSETS

Statement of Plan Assets (Assets at Market or Fair Value)

| Item | June 30, 2018 | June 30, 2017 |
|--|----------------------|----------------------|
| A. Cash and cash equivalents | \$ 26,996,675 | \$ 5,703,254 |
| B. Receivables: | | |
| 1. Investment income | 29,126 | 52,054 |
| 2. Contributions | 2,981,384 | 2,525,993 |
| 3. Receivables from investment sales | 78,004 | 216,258 |
| 4. Other | 4,503 | 0 |
| 5. Total Receivables | <u>\$ 3,093,017</u> | <u>\$ 2,794,305</u> |
| C. Investments | | |
| 1. Global equities | \$ 36,928,690 | \$ 31,203,254 |
| 2. Global fixed income | 2,323,833 | 3,040,784 |
| 3. Real estate | 11,976,970 | 9,893,216 |
| 4. Private equity | 3,562,736 | 2,549,069 |
| 5. Diversifying strategies | 11,179,228 | 8,360,978 |
| 6. Total Investments | <u>\$ 65,971,457</u> | <u>\$ 55,047,301</u> |
| D. Other Assets | \$ 3,484,487 | 2,340,478 |
| E. Liabilities | \$ 3,913,310 | \$ 2,963,014 |
| F. Total Market Value of Assets Available for Benefits | \$ 95,632,326 | \$ 62,922,324 |
| G. Voluntary Member Contributions | \$ 18,854,925 | \$ 14,413,593 |
| H. Market Value Net of Voluntary Member Contributions | \$ 76,777,401 | \$ 48,508,731 |
| I. Allocation of Investments | | |
| 1. Cash and cash equivalents | 31.01 % | 12.52 % |
| 2. Global equities | 38.62 % | 49.59 % |
| 3. Global fixed income | 2.43 % | 4.83 % |
| 4. Real estate | 12.52 % | 15.72 % |
| 5. Private equity | 3.73 % | 4.05 % |
| 6. Diversifying strategies | 11.69 % | 13.29 % |
| 7. Total Investments | <u>100.00 %</u> | <u>100.00 %</u> |

Reconciliation of Plan Assets

| Item | June 30, 2018 | June 30, 2017 |
|--|----------------------|----------------------|
| A. Market Value of Assets at Beginning of Year | \$ 62,922,324 | \$ 36,253,555 |
| B. Revenues and Expenditures | | |
| 1. Contributions | | |
| a. Member Contributions | \$ 14,140,617 | \$ 12,795,404 |
| b. Employer Contributions | 14,673,644 | 9,484,992 |
| c. State Contributions | 0 | 0 |
| d. Purchased Service Credit | 0 | 0 |
| e. Total | <u>\$ 28,814,261</u> | <u>\$ 22,280,396</u> |
| 2. Investment Income | | |
| a. Interest, Dividends, and Other Income | \$ 1,092,050 | \$ 1,015,308 |
| b. Net Realized and Unrealized Gains/(Losses) | 7,686,853 | 8,376,107 |
| c. Investment Expenses | <u>(333,313)</u> | <u>(290,673)</u> |
| d. Net Investment Income | \$ 8,445,590 | \$ 9,100,742 |
| 3. Benefits and Refunds | | |
| a. Refunds | \$ 1,991,465 | \$ 1,846,519 |
| b. Regular Monthly Benefits | 399,127 | 288,290 |
| c. Partial Lump-Sum Benefits Paid | 0 | 0 |
| d. Other | 0 | 0 |
| e. Total | <u>\$ 2,390,592</u> | <u>\$ 2,134,809</u> |
| 4. Administrative and Miscellaneous Expenses | \$ 2,171,693 | \$ 2,639,393 |
| 5. Other | \$ 12,436 | \$ 61,833 |
| 6. Transfers | \$ 0 | \$ 0 |
| C. Market Value of Assets at End of Year | \$ 95,632,326 | \$ 62,922,324 |

SECTION E

PARTICIPANT DATA

Summary of Participant Data as of June 30, 2018

Actives

| | |
|--|-------|
| A) Count Reported on file | 6,059 |
| B) Deferrals - "AnnSt" = "F" | - |
| C) Non-active status | (143) |
| D) Agency "88" | (29) |
| E) Non-eligible class code & bargaining unit | (63) |
| F) Hired after val date | (183) |
| G) No date of hire on file | - |
| H) No salary on file | (12) |
| I) Actives | 5,629 |

Retired

| | |
|---|----------|
| A) Number of records reported on data file: | 42,943 |
| B) Number of records in P/F plan: | (16,000) |
| C) Records not currently in receipt of benefits based on reported status codes: | (15,012) |
| D) Coded as Legacy records: | (11,684) |
| E) Number of records valued: | 247 |

Deferred

| | |
|---|-------|
| A) Number of records reported on data file | 943 |
| B) Retired (normal or early) in Legacy post 6/30/14 but not in Hybrid retiree file. Also has non-zero contribution balance. | 326 |
| C) Valued as inactive in prior year and would not have otherwise been valued in Hybrid this year | - |
| D) Valued as a vested active member in prior year but not in this year's active file and would not have otherwise been valued in Hybrid this year | 42 |
| E) Non-eligible class code & bargaining unit | (4) |
| F) Zero hybrid service | (15) |
| G) Valued as Hybrid Retiree | - |
| H) Less than 10 years of service | (91) |
| I) Zero mandatory contribution balance | (294) |
| J) Terminated before 6/30/2014 | (8) |
| K) Number of records to value | 899 |

Notes:

In addition to the above, we have included liabilities for 122 members that were reported as Component II (Legacy) duty disabilities. These members were less than age 62 and did not have a corresponding Component I (Hybrid) record.

Active Row C: The Active data file contains a field titled "Stat". Active members were only valued if the record for this field had a value of "1".

Active Row D: Agency "88" is the 36th District Court. We understand that members in that agency are not eligible to receive benefits.

Active Row E: For both this valuation and the prior valuation, we have received a separate list of Class Codes and Bargaining Units that are not eligible to receive benefits.

Deferred Row C: Only includes records that appear in the database last year.

Deferred Row E: See the note for Row E of the active member reconciliation.

Deferred Row H: Service provided in the data file is benefit service. Since benefit service does not accrue prior to June 30, 2014, vesting service was determined by combining service in the Legacy inactive file with service in the Hybrid inactive file.

Deferred Row I: Assumed to have refunded and forfeited Hybrid defined benefit.

Data Adjustments

Active records are reported in an excel file titled "BENEFITSPCFL_HYBRID_PP1_A (2).xlsx". Information from the Legacy active file (service) is appended to this file. Hybrid service provided on the data file was reduced by two months to account for additional service granted past the valuation date.

Inactive vested records are reported in an excel file titled "BENEFITSPCFL_HYBRID_PP1_F (2).xlsx". Information from the Legacy inactive file (Legacy service) is appended to the Hybrid file. Inactive vested members for Component I (Hybrid) have not been fully processed by Detroit staff. In particular, members that have retired or under the Legacy plan with a deferred Hybrid benefit are not included in the Inactive data sent to us. These members were processed using information from the active or retiree file with the following assumptions:

- Benefit service was calculated by using the time elapsed from June 30, 2014 to the retirement date; and
- For members that have retired in the Legacy plan, the AFC that was used to calculate the benefit is the Component II (Legacy) amount. If unavailable, \$30,000 was used for the AFC.

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. Benefits for dependent children are assumed to cease at age 21.

We have included liabilities for 122 members that were reported as Component II (Legacy) duty disabilities. These members were less than age 62 and did not have a corresponding Component I (Hybrid) record. The benefit for these members was estimated by using information on the Component II (Legacy) record combined with estimated service from June 30, 2014 to age 62.

Please see our 2018 data summary letter dated December 18, 2018 for additional details.

Reconciliation

| | Active | | Term. Vested | Retirees | | Totals |
|------------------------|--------------|----------------------|--------------|------------|------------------|--------------|
| | Count | Pay | Count | Count | Monthly Benefits | Count |
| 2017 | 5,117 | \$229,954,351 | 933 | 200 | \$27,974 | 6,250 |
| Change in Pay/Pensions | N/A | 13,066,181 | N/A | N/A | (3,580) | |
| New | 1,289 | 51,208,522 | 33 | | | 1,322 |
| New Beneficiary | | | | 1 | 469 | 1 |
| Retired | (29) | (1,283,724) | (16) | 50 | 9,401 | 5 |
| Non-Duty Disabled | | | | - | - | - |
| Duty Disabled | | | | - | - | - |
| Death/Off | | | (150) | (3) | (126) | (153) |
| Vested Terminated | (187) | (7,945,495) | 139 | | | (48) |
| Non-Vested Terminated | (601) | (23,367,887) | | | | (601) |
| Rehired | 40 | 1,660,038 | (40) | - | - | - |
| Data Adjustment | - | - | - | (1) | (100) | (1) |
| 2018 | 5,629 | \$263,291,986 | 899 | 247 | \$34,038 | 6,775 |

Notable Data Changes:

In addition to the above, we have included liabilities for 122 members that were reported as Component II (Legacy) duty disabilities. These members were less than age 62 and did not have a corresponding Component I (Hybrid) record.

48 active vested terminations were not reported on the Terminated Vested file. We have assumed these members refunded and forfeited their defined benefit.

150 Terminated Vested members were valued last year but will not be valued this year. A majority of these members did not appear in the raw Inactive data last year. As such, we have assumed these members refunded and forfeited their defined benefit.

5 retired members were new this year and not found in prior years.

The data adjustments relate to records where we could not specifically identify the activity during the year. This could be the result of duplicate Social Security numbers or corrected Social Security numbers.

Summary of Member Data

June 30, 2018

Active Members

| | General | D.O.T. | DWSD | Library | Totals |
|--|----------|----------|----------|----------|----------|
| Number | 3,842 | 967 | 528 | 292 | 5,629 |
| % Change in active members from prior year | 15.3 % | (7.0)% | 13.8 % | 3.5 % | 10.0 % |
| Annual payroll (\$ millions)* | \$ 188.0 | \$ 35.4 | \$ 26.8 | \$ 13.1 | \$ 263.3 |
| Average pay | \$48,926 | \$36,598 | \$50,778 | \$44,918 | \$46,774 |
| % Change in average pay from prior year | 2.5 % | 4.9 % | 3.7 % | 6.4 % | 4.1 % |
| Average age | 44.8 | 47.7 | 48.5 | 50.2 | 45.9 |
| Average eligibility service | 9.2 | 12.4 | 13.9 | 16.7 | 10.6 |

Retired Members

| | General | D.O.T. | DWSD | Library | Totals |
|---|-----------|----------|----------|----------|-----------|
| Number | 95 | 38 | 97 | 17 | 247 |
| Annual benefits including annuities as report | \$243,133 | \$70,601 | \$99,047 | \$18,585 | \$431,366 |
| Average benefits as reported | \$ 2,559 | \$ 1,858 | \$ 1,021 | \$ 1,093 | \$ 1,746 |
| % Change in average benefit | (13.5)% | 87.6 % | 3.7 % | 3.1 % | (2.5)% |

Inactive Members*

| | General | D.O.T. | DWSD | Library | Totals |
|------------------------------|-----------|-----------|-----------|----------|-------------|
| Number | 304 | 118 | 447 | 30 | 899 |
| Average FAC | \$ 47,403 | \$ 52,243 | \$ 50,620 | \$44,580 | \$ 49,544 |
| Average service | 1.7 | 2.0 | 1.3 | 2.1 | 1.6 |
| Annual benefits (estimated) | \$386,093 | \$188,536 | \$467,761 | \$38,126 | \$1,080,516 |
| Average benefits (estimated) | \$ 1,270 | \$1,598 | \$1,046 | \$1,271 | \$1,202 |
| % Change in average service | (15.0)% | 0.0 % | (13.2)% | 16.7 % | (5.9)% |
| % Change in average FAC | (4.6)% | (15.5)% | (11.9)% | 9.7 % | (9.9)% |

Legacy Disabled Members*

| | General | D.O.T. | DWSD | Library | Totals |
|------------------------------|-----------|-----------|-----------|---------|-----------|
| Number | 65 | 21 | 36 | 0 | 122 |
| Annual benefits (estimated) | \$450,266 | \$138,769 | \$278,394 | \$0 | \$867,429 |
| Average benefits (estimated) | \$ 6,927 | \$6,608 | \$7,733 | N/A | \$7,110 |

* Benefits unavailable. Benefits were estimated using AFC and service.

Active Members as of June 30, 2018 by Attained Age and Years of Service Retirement System Totals

| 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 | 70 | | | | | | | 70 | \$ 1,505,776 | |
| 20-24 | 262 | 2 | | | | | | 264 | 7,155,550 | |
| 25-29 | 453 | 8 | 2 | | | | | 463 | 17,747,497 | |
| 30-34 | 390 | 34 | 23 | 0 | | | | 447 | 19,927,735 | |
| 35-39 | 341 | 40 | 59 | 43 | 0 | | | 483 | 23,439,542 | |
| 40-44 | 305 | 53 | 75 | 100 | 46 | 2 | | 581 | 28,210,545 | |
| 45-49 | 336 | 52 | 80 | 155 | 145 | 28 | 2 | 798 | 38,978,416 | |
| 50-54 | 283 | 51 | 63 | 153 | 215 | 84 | 54 | 903 | 44,409,642 | |
| 55-59 | 195 | 44 | 68 | 129 | 172 | 120 | 136 | 864 | 42,612,331 | |
| 60-64 | 125 | 31 | 48 | 74 | 89 | 72 | 105 | 544 | 28,271,252 | |
| 65-69 | 43 | 17 | 18 | 18 | 15 | 8 | 26 | 145 | 7,870,697 | |
| 70-74 | 13 | 6 | 4 | 4 | 7 | 2 | 8 | 44 | 2,250,087 | |
| 75-79 | 3 | 2 | 4 | 6 | 1 | 2 | 5 | 23 | 912,916 | |
| Totals | 2,819 | 340 | 444 | 682 | 690 | 318 | 336 | 5,629 | \$263,291,986 | |

Group Averages:

Age: 45.9 years
Benefit Service: 2.5 years
Eligibility Service: 10.6 years
Annual Pay: \$46,774

Historical Summary of Active Member Data

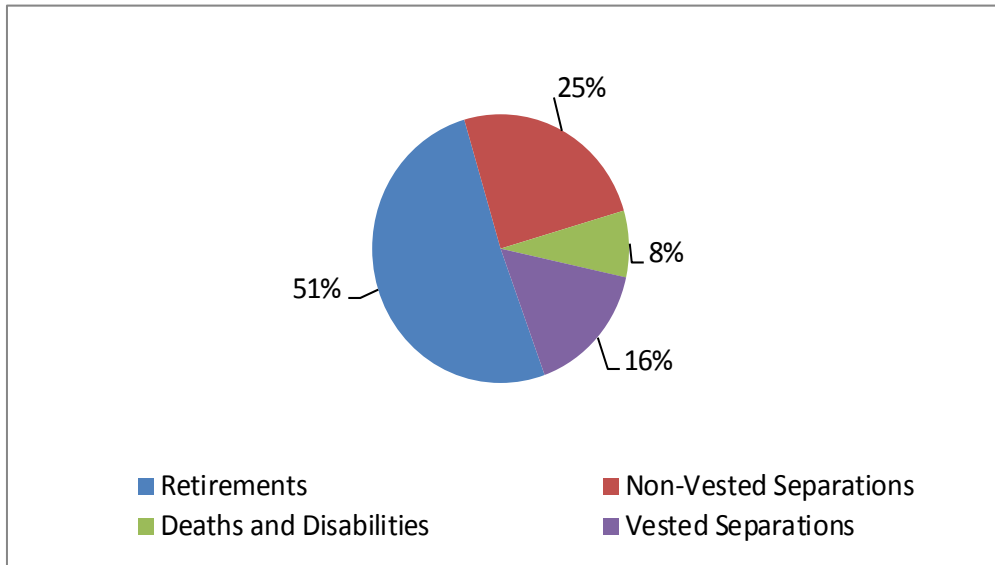
| Valuation Date | Active Members | | Covered Payroll | | Average Salary | | Average | | |
|----------------|----------------|------------|-----------------|------------|----------------|------------|---------|---------|-----------|
| | No. | % Increase | \$ Amount | % Increase | \$ Amount | % Increase | Age | Service | Entry Age |
| 2014# | 4,881 | N/A | \$203,507,079 | N/A | \$ 41,694 | N/A | 49.2 | 16.0 | 33.2 |
| 2015 | 4,981 | 2.0% | \$199,135,119 | (2.1)% | \$ 39,979 | (4.1)% | 48.6 | 15.3 | 33.3 |
| 2016 | 4,235 | (15.0)% | \$169,014,411 | (15.1)% | \$ 39,909 | (0.2)% | 47.7 | 13.1 | 34.6 |
| 2017 | 5,117 | 20.8% | \$229,954,351 | 36.1% | \$ 44,939 | 12.6% | 46.4 | 11.3 | 35.1 |
| 2018 | 5,629 | 10.0% | \$263,291,986 | 14.5% | \$ 46,774 | 4.1% | 45.9 | 10.6 | 35.3 |

Payroll shown for 2014 is based on payroll reported for Component II (Legacy Plan). Covered Payroll information under Component I payroll definitions was not available. 2014 Valuation results were adjusted to estimate the difference between the Component I and Component II Covered Pay.

Summary of Membership Data by Category

| | <u>June 30, 2018</u> | <u>June 30, 2017</u> |
|---|----------------------|----------------------|
| Active Members | | |
| Number | 5,629 | 5,117 |
| Average age (years) | 45.9 | 46.4 |
| Average service (years) | 10.6 | 11.3 |
| Average salary | \$46,774 | \$44,939 |
| Total payroll supplied, annualized | \$263,291,986 | \$229,954,351 |
| Vested Inactive Members | | |
| Number | 899 | 933 |
| Average age (years) | 54.8 | 53.8 |
| Total calculated deferred benefits (\$ millions) | \$1.1 | \$1.3 |
| Average annual deferred benefit (estimated) | \$1,202 | \$1,437 |
| Service Retirees | | |
| Number | 241 | 195 |
| Average age (years) | 65.2 | 64.0 |
| Total annual benefits (\$ millions) (excluding annuities) | \$0.4 | \$0.32 |
| Average annual benefit (estimated) (excluding annuities) | \$1,593 | \$1,625 |
| Disability Retirees | | |
| Number | 0 | 0 |
| Average age (years) | N/A | N/A |
| Total annual benefits (\$ millions) (excluding annuities) | N/A | N/A |
| Average annual benefit (estimated) (excluding annuities) | N/A | N/A |
| Beneficiaries (Including death-in-service) | | |
| Number | 6 | 5 |
| Average age (years) | 61.4 | 62.3 |
| Total annual benefits (\$ millions) (excluding annuities) | \$0.0 | \$0.0 |
| Average annual benefit (estimated) (excluding annuities) | \$4,082 | \$3,773 |
| Legacy Disability Retirees | | |
| Number | 122 | 0 |
| Average age (years) | 53.8 | N/A |
| Total annual benefits (\$ millions) (estimated) | \$0.9 | N/A |
| Average annual benefit (estimated) | \$7,110 | N/A |

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 5,629 active members. Eventually, 1,425 people are expected to terminate covered employment prior to retirement and forfeit eligibility for an employer provided benefit. 3,754 people are expected to receive monthly retirement benefits either by retiring directly from active service, or by retiring from vested deferred status. 450 people are expected to incur death-in-service or disability benefits.

SECTION F

METHODS AND ASSUMPTIONS

Summary of Assumptions and Methods Used for Actuarial Valuations Adopted by Board of Trustees

Funding Methods

The entry age actuarial cost method was used in determining liabilities and normal cost as prescribed by Section 9.3(1) of the Combined GRS Plan. Under this method, each individual's normal cost is determined as a level percent of pay based on a replacement life normal cost. Normal cost for each member is based on the Component I benefits and eligibilities applicable to that member and is determined to be the level percent of payroll from hire date to the age of last decrement necessary to fund the benefits. This method is based on the objective of the plan to separately fund Transition Cost and future accruals. The application of this method differs for funding and accounting.

Unfunded Actuarial Accrued Liabilities - Actual employer contributions through June 30, 2023 are set at 5.0% of pay. Additional funding for Transition Costs may occur as a result of Component II ASF transfers. Employer contributions after June 30, 2023 will be actuarially determined based on the Board's funding policy. The Board funding policy has not yet been established.

Present assets are set equal to the Market Value.

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

Summary of Assumptions and Methods Used for Actuarial Valuations Adopted by Board of Trustees

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. The Board has elected to defer the next experience study until the five-year period of experience after the City's bankruptcy from July 1, 2015 through June 30, 2020 in order to avoid any distortions during the bankruptcy.

Economic Assumptions

Actuarial Assumptions

The assumptions and methods are those adopted by the Board with the exception of the discount rate. For purposes of plan funding, the discount rate is 6.75% as prescribed by Section 1.16(3) of the Combined GRS Plan.

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

Pay increase assumptions for individual active members are shown on page 32. 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.

Price inflation is not directly used in the valuation. For purposes of assessing the reasonableness of the assumed rate of return, we assumed a price inflation of 2.50% per year.

Non-Economic Assumptions

The mortality table used to measure retired life mortality 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. Tables were extended below age 50 with a cubic spline to the published Juvenile rates. Pre-retirement mortality is based on the corresponding Employee tables. 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). For disabled members, the same tables are used. The rationale for the mortality assumption is provided in the 2008-2013 Mortality Experience Study issued February 4, 2015.

The probabilities of retirement for members eligible to retire are shown on pages 33 and 34. 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 (excluding *death-in-service* and including *disability*) are shown for sample ages on page 36. The rationale is based on the 2002-2007 Experience Study for the Component II Plan.

Sample Salary Adjustment Rates

| Sample Ages | Salary Increase Assumptions For an Individual Member | | |
|----------------|---|---------------------|-----------------------|
| | Merit & Seniority | Wage* (Economic) | Increase Next Year |
| 20 | 4.9% | 3.0% | 7.9% |
| 25 | 4.9% | 3.0% | 7.9% |
| 30 | 4.1% | 3.0% | 7.1% |
| 35 | 3.0% | 3.0% | 6.0% |
| 40 | 2.3% | 3.0% | 5.3% |
| 45 | 1.8% | 3.0% | 4.8% |
| 50 | 1.3% | 3.0% | 4.3% |
| 55 | 0.9% | 3.0% | 3.9% |
| 60 | 0.5% | 3.0% | 3.5% |
| Ref | 81 | | |

* Select and ultimate wage inflation 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
 100% of Male Rates Set-Forward 1 Year
 100% of Female Rates Set-Forward 1 Year

| Sample Attained Ages in 2018 | Future Life Expectancy (years) | |
|---------------------------------------|-----------------------------------|-------|
| | Men | Women |
| 45 | 38.62 | 41.96 |
| 50 | 33.66 | 36.91 |
| 55 | 28.90 | 32.01 |
| 60 | 24.35 | 27.26 |
| 65 | 20.05 | 22.69 |
| 70 | 16.07 | 18.38 |
| 75 | 12.45 | 14.42 |
| 80 | 9.26 | 10.91 |

Probabilities of Age/Service Retirement for 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 with Unreduced Benefits | | |
|--------------------|---|--------|--------|
| | E.M.S. | D.O.T. | Others |
| 45 | 25% | | |
| 46 | 25% | | |
| 47 | 25% | | |
| 48 | 22% | | |
| 49 | 20% | | |
| 50 | 18% | 55% | 50% |
| 51 | 15% | 50% | 50% |
| 52 | 15% | 50% | 45% |
| 53 | 15% | 50% | 45% |
| 54 | 15% | 55% | 40% |
| 55 | 15% | 50% | 30% |
| 56 | 15% | 50% | 30% |
| 57 | 15% | 50% | 30% |
| 58 | 15% | 50% | 30% |
| 59 | 15% | 55% | 40% |
| 60 | 40% | 40% | 25% |
| 61 | 30% | 30% | 25% |
| 62 | 30% | 30% | 25% |
| 63 | 30% | 30% | 25% |
| 64 | 30% | 30% | 25% |
| 65 | 30% | 30% | 35% |
| 66 | 30% | 30% | 30% |
| 67 | 30% | 30% | 25% |
| 68 | 30% | 50% | 25% |
| 69 | 30% | 50% | 25% |
| 70 | 100% | 100% | 20% |
| 71 | | | 20% |
| 72 | | | 20% |
| 73 | | | 20% |
| 74 | | | 20% |
| 75 | | | 20% |
| 76 | | | 20% |
| 77 | | | 20% |
| 78 | | | 20% |
| 79 | | | 20% |
| 80 | | | 100% |
| Ref | 537 | 1648 | 1647 |

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.

Probabilities of Age/Service Retirement for 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 with Unreduced Benefits | |
|--------------------|---|--------|
| | E.M.S. and D.O.T. | Others |
| 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 | 100% | 30% |
| 71 | | 30% |
| 72 | | 30% |
| 73 | | 30% |
| 74 | | 30% |
| 75 | | 30% |
| 76 | | 30% |
| 77 | | 30% |
| 78 | | 30% |
| 79 | | 30% |
| 80 | | 100% |
| Ref | 851 | 1292 |

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.

Probabilities of Early Retirement for Members Eligible for Early Retirement

| Retirement Ages | Percent of Eligible Active Members Retiring Within Next Year with Reduced Benefits |
|--------------------|---|
| 55 | 7% |
| 56 | 8% |
| 57 | 9% |
| 58 | 10% |
| 59 | 12% |
| 60 | 12% |
| 61 | 12% |
| 62 | 12% |
| Ref | 1649 |

Sample Rates of Separation from Active Employment Before Retirement

| Sample Ages | Years of Service | % of Active Members Separating Within Next Year | | | |
|-------------|------------------|---|--------|------------|------------|
| | | Withdrawal | | | |
| | | E.M.S. | D.O.T. | Others | |
| | | | | Men | Women |
| ALL | 0 | 11.00% | 18.00% | 18.00% | 20.00% |
| | 1 | 10.00% | 16.00% | 15.00% | 16.00% |
| | 2 | 8.00% | 14.00% | 13.00% | 14.00% |
| | 3 | 8.00% | 11.00% | 11.00% | 12.00% |
| | 4 | 7.00% | 9.00% | 10.00% | 10.00% |
| 25 | 5 & Over | 6.70% | 8.00% | 7.60% | 7.60% |
| 30 | | 5.90% | 7.60% | 7.22% | 7.22% |
| 35 | | 5.20% | 5.56% | 5.28% | 5.28% |
| 40 | | 4.40% | 4.26% | 4.05% | 4.05% |
| 45 | | 3.40% | 3.69% | 3.51% | 3.51% |
| 50 | | 2.40% | 3.50% | 3.33% | 3.33% |
| 55 | | 2.00% | 3.50% | 3.33% | 3.33% |
| 60 | | 0.00% | 3.50% | 3.33% | 3.33% |
| Ref | | 338 | 143 | 584 | 188 |
| | | 1068 | 212 | 212 x 0.95 | 212 x 0.95 |

| Sample Ages | % of Active Members Becoming Disabled Within Next Year | | | | | | | |
|-------------|--|--------|-------|--------|----------|--------|------|--------|
| | D.O.T. | | | | Others | | | |
| | Ordinary | | Duty | | Ordinary | | Duty | |
| 25 | 0.02% | 0.03% | 0.01% | 0.25% | | | | |
| 30 | 0.05% | 0.08% | 0.04% | 0.29% | | | | |
| 35 | 0.14% | 0.21% | 0.11% | 0.34% | | | | |
| 40 | 0.27% | 0.42% | 0.21% | 0.39% | | | | |
| 45 | 0.51% | 0.79% | 0.40% | 0.45% | | | | |
| 50 | 0.66% | 1.03% | 0.51% | 0.52% | | | | |
| 55 | 0.76% | 1.18% | 0.59% | 0.60% | | | | |
| 60 | 0.86% | 1.34% | 0.67% | 0.70% | | | | |
| Ref | 23 | x 0.45 | 23 | x 0.70 | 23 | x 0.35 | 423 | x 0.90 |

Miscellaneous and Technical Assumptions

| | |
|-------------------------------------|---|
| Benefit Service | Exact fractional service is used to determine the amount of benefit payable. |
| Decrement Operation | Disability and mortality decrements do not operate during the first 5 years of service. Disability and withdrawal also do not operate during retirement eligibility. |
| Decrement Timing | Decrements of all types are assumed to occur mid-year. |
| Eligibility Testing | Eligibility for benefits is determined based upon the age nearest birthday and rounded service on the date the decrement is assumed to occur. |
| Forfeitures | None. |
| Marriage Assumption | 100% of males and 100% of females are assumed to be married for purposes of death-in-service benefits. Male spouses are assumed to be three years older than female spouses for active member valuation purposes. |
| Normal Form of Benefit | Straight life is the normal form of benefit. |
| 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. |
| Sick Leave | None. |
| Pay Increase Timing | End of (Fiscal) year. This is equivalent to assuming that reported pays represent amounts to be paid to members during the year starting on the valuation date. |
| Disability Benefits | Duty Disability benefits were increased by 3.5% to account for the Death While Disabled provision. The 3.5% increase was determined by examining the effect of the Death While Disabled provision on several hypothetical test cases. |
| Workers Compensation | Workers compensation for duty death-in-service benefits was assumed to equally offset the 10% AFC minimum benefit. |
| Actuarial Equivalent | No adjustments have been made for Actuarial Equivalent benefits. The Board adopted assumptions for Actuarial Equivalence to be a 80%/20% unisex blend of RP-2014 mortality (Male/Female) with Blue Collar Adjustment, set ahead 1 year for males and females, projected 11 years with MP-2014, an interest rate of 6.75, and a 0.5% simple COLA starting the later of 1 year after retirement or age 62 for optional forms of payment and early retirement reduction. Assumptions for annuitizing member contributions are the same except for using a 60%/40% unisex blend, a 5.25% assumed rate of interest, and no COLA. |
| IRC Section 415 Limit | No adjustments have been made for 415 limits. The limit is assumed to grow with wage inflation. |
| IRC Section 401(a)(17) Limit | All of the member salary provided falls below the 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. |

Miscellaneous and Technical Assumptions (Concluded)

| | |
|--------------------------------|--|
| COLA (VPIF) | The valuation assumption is that on average future COLA's will be 0.5%. The rationale for this assumption is that COLA's are not guaranteed. This assumption was set based on some scenario analysis at plan inception and will be reviewed as experience emerges and the plan evolves. Unless otherwise stated, all costs shown in this report are based on a 0.5% VPIF. Transition Costs are based on a 0.0% VPIF. |
| Voluntary Contributions | For the valuation, future voluntary contributions will be reflected in future valuations as they occur. No adjustments have been made to reflect future interest crediting to voluntary contributions. For fiscal responsibility calculation, see Section C for assumptions. |
| New Entrant Assumption | New entrants are assumed to replace the current workforce as members separate from service under current valuation assumptions. Total payroll is expected to grow with wage inflation. |
| Pop-Up Benefits | For current retirees with a pop-up benefit, the value of the pop-up was estimated by valuing a non-pop-up option and increasing the associated liabilities by 2%. |

SECTION G

PLAN PROVISION SUMMARY (AS APPROVED BY STAFF)

City of Detroit General Retirement System

Summary of Component I Benefit Provisions Evaluated

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.

Full Time Employees

Full Time Employees are individuals who are required to work 600 hours per year. Part time transit operators working 25 hours per week are not full time employees. Special Service Operators are required to work 1,440 hours per year. However, once a Special Service Operator meets the requirement in any year, he or she is deemed to meet it in all future years.

Plan Membership

The membership of the Retirement System shall consist of all persons who are Full Time Employees of the City of Detroit except persons who are members of the Police and Fire Retirement System of the City of Detroit and those individuals who are active members in any other public employee pension plan adopted by either the State of Michigan (other than the Michigan National Guard), or any other political subdivision of the State of Michigan.

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 an employee. Credited Service is recorded from the later of July 1, 2014, or the date of hire whichever is later.

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.

City of Detroit General Retirement System

Summary of Component I Benefit Provisions Evaluated

Average Final Compensation

Compensation: Compensation is base salary or wages, excluding bonuses, overtime pay, payment of unused accrued sick leave, longevity pay, payment for unused accrued vacation, the cost or value of fringe benefits, termination or severance pay, reimbursement of expenses or other extra payment of any kind. 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 10 consecutive years of Credited Service (including Prior Service) immediately preceding the date of the members last termination with the employer. If the member has less than ten years of Credited Service (including Prior Service), the Average Final Compensation is the average of the compensation received during all years of Credited Service.

Normal Retirement

Normal Retirement Age: The Normal Retirement Age is 62. For individuals who were active employees and who had 10 or more years of Vesting Service as of June 30, 2014 the normal retirement age is reduced as follows.

| <u>Age as of July 1, 2014</u> | <u>Normal Retirement Age</u> |
|-------------------------------|------------------------------|
| 52 years or younger | 62 Years |
| 53 years | 61 years and 9 months |
| 54 years | 61 years and 6 months |
| 55 years | 61 years and 3 months |
| 56 years | 61 years |
| 57 years | 60 years and 9 months |
| 58 years | 60 years and 6 months |
| 59 years | 60 years and 3 months |
| 60 years | 60 years |
| 61 years | 60 years |

Normal Retirement Date: The later of 10 years of Vesting Service and attainment of Normal Retirement Age.

Normal Retirement Amount: The retirement allowance payable to a member who retires on or after the normal retirement date is 1.5% times Average Final Compensation times Credited Service (after June 30, 2014) measured to the nearest month.

Early Retirement

Eligibility: Age 55 with 30 or more years of credited service plus prior service.

Early Retirement Amount: The early retirement amount is the Actuarial Equivalent of the deferred retirement allowance that would be payable to the member on the Normal Retirement Date, assuming that the member terminated employment on the early retirement date.

City of Detroit General Retirement System

Summary of Component I Benefit Provisions Evaluated

Deferred Retirement (Vested Benefit)

Eligibility: 10 years of Vesting Service.

Benefit Commencement: Age 62.

Annual Amount: Same as Normal Retirement but based on Average Final Compensation and Credited Service at the time of termination.

Disability Retirement

Eligibility: The individual must be eligible for long term disability benefits under a policy or plan of insurance or self-insurance maintained by the employer.

Amount: The Normal Retirement Allowance payable at Age 62. For members disabled in the line of duty, credited service accrues while a member is entitled to receive long term disability under the employer's plan or policy.

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: The surviving spouse is eligible to receive a monthly amount equal to the member's Retirement Allowance at time of death (minimum 10% of Average Final Compensation), unreduced for early payment, and payable until the surviving Spouse's death. Amounts payable from Worker's Comp or similar programs are offset against the amount payable to the spouse.

Ordinary (Other than Line of Duty) Death Before Retirement

Eligibility: 10 or more years of credited service (or death during disability, but prior to commencement of the retirement allowance). 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. Amounts payable from Worker's Comp or similar programs are offset against the amount payable to the spouse.

City of Detroit General Retirement System

Summary of Component I Benefit Provisions Evaluated

Refund of Mandatory Contributions

A member who ceases to be an employee for reasons other than 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: Attainment of at least Age 62, and in receipt of a retirement allowance for at least 12 months as of the first day of the Plan Year.

Amount: Beginning July 1, 2018 and effective the first date of each Plan year thereafter, the Board may determine that a retiree's Component I Retirement Allowance shall be increased by 2% of the original 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 100%. The VPIF escalator is not compounded.

Contributions

Members: 4% of Compensation. Member contributions are "picked up" in accordance with IRC 414(h).

Employers: 5% of Compensation commencing July 1, 2014 and ending June 30, 2023, to be split between the Pension Accumulation Fund and the Rate Stabilization reserve. For Plan years beginning July 1, 2023 and later, contributions shall be determined by an Actuary using reasonable and appropriate assumptions approved by the Board and the Investment Committee.

Voluntary Employee Contributions

Eligibility: Non-union member, or union member with Coverage by a collective bargaining agreement that permits the member to make Voluntary Employee Contributions to Component I.

Amount: 3%, 5%, or 7% of compensation at the election of the member. 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 of Retirement System Assets for the second Plan Year immediately preceding the Plan 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 the 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.

City of Detroit General Retirement System

Summary of Component I Benefit Provisions Evaluated

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 either in 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.

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.

City of Detroit General Retirement System

Summary of Component I Benefit Provisions Evaluated

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.

Coordination of Benefits: According to such rules and regulations as the Board shall adopt, until the first payment of a Retirement Allowance becomes due, but not thereafter, a Member under age sixty-five may elect to have the Member's Straight Life Retirement Allowance provided for under Component I equated on an Actuarial Equivalent basis to provide an increased Retirement Allowance payable to age sixty-two or age sixty-five, and to provide a decreased Retirement Allowance thereafter. The increased Retirement Allowance payable to such age shall approximate the total of the decreased Retirement Allowance payable thereafter and the estimated social security benefit. If a Member elects to receive increased and then decreased Retirement Allowance payments provided for in this paragraph, he or she may also elect to have such payments reduced by electing one of the optional forms of payment described above.

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.

City of Detroit General Retirement System

Summary of Component I Benefit Provisions Evaluated

Rehire Before or After Retirement

A non-vested former member who is reemployed (except as a part time transit operator) within 6 years of termination may repay mandatory contributions. In such case, forfeited Credited Service and Vesting service are restored. If the member is reemployed more than 6 years following separation, mandatory contributions cannot be repaid. Vesting Service and Credited Service start over beginning with the date of reemployment.

A former member who is vested but has not yet begun to receive a Retirement Allowance and who is rehired **prior to being separated for six years** shall have the 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.

A former member who is vested but has not begun to receive a Retirement Allowance and **who is rehired after being separated for more than six years** shall be entitled to two separate and distinct pension benefits under Component I, each to be calculated in accordance with the provisions of Component I of the Retirement System in effect at the time of each 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 with an Employer 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.
- The Coordination of Benefits (Equated Social Security) option will not be available with respect to payment of the second Retirement Allowance.

SECTION G

GLOSSARY

Glossary

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| <i>Accrued Service</i> | The service credited under the plan which was rendered before the date of the actuarial valuation. |
| <i>Actuarial Accrued Liability (AAL)</i> | The difference between the Actuarial Present Value of Future Benefits, and the Actuarial Present Value of Future Normal Costs. |
| <i>Actuarial Assumptions</i> | Assumptions about future plan experience that affect costs or liabilities, such as: mortality, withdrawal, disablement, and retirement; future increases in salary; future rates of investment earnings; future investment and administrative expenses; characteristics of members not specified in the data, such as marital status; characteristics of future members; future elections made by members; and other items. |
| <i>Actuarial Cost Method</i> | A procedure for allocating the Actuarial Present Value of Future Benefits between the Actuarial Present Value of future Normal Costs and the Actuarial Accrued Liability. |
| <i>Actuarial Equivalent</i> | Of equal Actuarial Present Value, determined as of a given date and based on a given set of Actuarial Assumptions. |
| <i>Actuarial Present Value (APV)</i> | The amount of funds required to provide a payment or series of payments in the future. It is determined by discounting the future payments with an assumed interest rate and with the assumed probability each payment will be made. |
| <i>Actuarial Present Value of Future Benefits (APVFB)</i> | The Actuarial Present Value of amounts which are expected to be paid at various future times to active members, retired members, beneficiaries receiving benefits, and inactive, nonretired members entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due. |
| <i>Actuarial Valuation</i> | The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial Valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB No. 25, such as the Funded Ratio and the Annual Required Contribution (ARC). |
| <i>Actuarial Value of Assets</i> | The value of the assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets or a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the actuarially required contribution (ARC). |

Glossary

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| <i>Actuarially Determined Employer Contribution</i> | The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under the Plan's actuarial funding policy. |
| <i>AFC</i> | Average Final Compensation. |
| <i>Amortization Method</i> | A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the rate at which total covered payroll of all active members is assumed to increase. |
| <i>Amortization Payment</i> | That portion of the plan contribution or actuarially determined employer contribution which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability. |
| <i>Amortization Period</i> | The period used in calculating the Amortization Payment. |
| <i>APTE</i> | Association of Professional and Technical Employees. |
| <i>ASF</i> | Annuity Savings Fund of the Component II (Legacy) Plan. |
| <i>Closed Amortization Period</i> | A specific number of years that is reduced by one each year, and declines to zero with the passage of time. For example if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. |
| <i>COLA</i> | Cost-of-Living Adjustment. Analogous to a VPIF (see VPIF on page 49). |
| <i>Contribution Budgeting Liability</i> | An expected return-based measure of pension obligation. |
| <i>D.O.T.</i> | Department of Transportation. |
| <i>Employer Normal Cost</i> | The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions. |
| <i>E.M.S.</i> | Emergency Medical Service. |

Glossary

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| <i>Equivalent Single Amortization Period</i> | For plans that do not establish separate amortization bases (separate components of the UAAL), this is the same as the Amortization Period. For plans that do establish separate amortization bases, this is the period over which the UAAL would be amortized if all amortization bases were combined upon the current UAAL payment. |
| <i>Experience Gain/Loss</i> | A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two actuarial valuations. To the extent that actual experience differs from that assumed, Unfunded Actuarial Accrued Liabilities emerge which may be larger or smaller than projected. Gains are due to favorable experience, e.g., the assets earn more than projected, salaries do not increase as fast as assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, losses are the result of unfavorable experience, i.e., actual results that produce Unfunded Actuarial Accrued Liabilities which are larger than projected. |
| <i>Funded Ratio</i> | The ratio of the Actuarial Value of Assets to the Actuarial Accrued Liability. |
| <i>GASB</i> | Governmental Accounting Standards Board. |
| <i>GASB No. 67 and GASB No. 68</i> | These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 68 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 67 sets the rules for the systems themselves. |
| <i>GLWA</i> | Great Lakes Water Authority. |
| <i>Normal Cost</i> | The annual cost assigned, under the Actuarial Cost Method, to the current plan year. |
| <i>Open Amortization Period</i> | An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. In other words, if the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never completely disappear, but will become smaller each year, either as a dollar amount or in relation to covered payroll. |
| <i>POA</i> | The 8th Amended Plan for the Adjustment of the Debt of the City of Detroit. |
| <i>POC</i> | Pension Obligation Certificates. |

Glossary

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| <i>Reserve Account</i> | An account used to indicate that funds have been set aside for a specific purpose and are not generally available for other uses. |
| <i>RSF</i> | Rate Stabilization Fund. |
| <i>SAAA</i> | Senior Accountants, Analysts, and Appraisers Association. |
| <i>Solvency Liability</i> | 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. |
| <i>Transition Cost</i> | Initial unfunded liability as described in Section E-16 of the Plan Document. |
| <i>Unfunded Actuarial Accrued Liability</i> | The difference between the Actuarial Accrued Liability and Actuarial Value of Assets. |
| <i>Valuation Date</i> | The date as of which the Actuarial Present Value of Future Benefits are determined. The benefits expected to be paid in the future are discounted to this date. |
| <i>VPIF</i> | Variable Pension Improvement Factor. Discussed in Section 6.2 of the Plan Document. This is analogous to a post-retirement Cost-of-Living Adjustment (COLA). |