The General Retirement System of the City of Detroit

Annual Actuarial Valuation of Component I

As of June 30, 2017

GRS

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May 30, 2018

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, 2017

Dear Board Members:

The results of the June 30, 2017 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 required 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, 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, 2017. 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.

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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. The data supplied by the Retirement System was contained in one file this year. However, the reported pays in that file were determined under Component II rules while benefit service was total service (Component I benefit service plus Component II benefit service). We, therefore, collected additional Component I pays and performed several manual adjustments (after confirming with System staff) to create data that could be used for this valuation. More details 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 — Judith A. Kermans — Kenneth G. Alberts

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, 2017		June 30, 2016
Contributions For Fiscal Year Ending		June 30, 2019		June 30, 2018
Employer Contributions				
Mandated Percentage of Covered Payroll		5.00 %		5.00 %
Estimated Annual Amount (Mandated Contributions only)	$	11.7	$	8.8
Membership				
Number of:				
Active Members		5,117		4,235
Retirees and Beneficiaries		200		125
Inactive, Nonretired Members		933		1,073
Total		6,250		5,433
Valuation Payroll	$	230.0	$	169.0
Assets				
Market Value (1)	$	62.9	$	36.3
Return on Market Value		14.08 %		(10.63)%
Actuarial Information (Assuming 0.5% VPIF)				
Total Normal Cost Rate		7.55 %		7.43 %
Member Contribution Rate		4.00 %		4.00 %
Employer Normal Cost Rate		3.55 %		3.43 %
Actuarial Accrued Liability (2)	$	100.9	$	77.5
Unfunded Actuarial Accrued Liability: (2) - (1)		38.0		41.2
Funded Ratio: (1) / (2)		62.40 %		46.80 %
Equivalent Single Amortization Period		13		21
Employer Rate needed for 15-Year Amortization		4.85%		5.41%
Additional Funding Information (Assuming a full 2.0% VPIF)				
Employer Normal Cost Rate		4.43 %		4.25 %
Equivalent Single Amortization Period		Over 100 Years		Over 100 Years
Employer Rate needed for 15-Year Amortization		6.27%		6.78%
Risk Metrics (Assuming 0.5% VPIF)				
Actuarial Accrued Liability Divided by Payroll		0.4		0.5
Market Value of Assest Divided by Payroll		0.3		0.2

Notes: *VPIF is the Variable Pension Improvement Factor or ad hoc COLA.*
Equivalent single amortization period for FY 2019 is after reflection of a special employer contribution of $3.1 million scheduled to be made by June 30, 2018.

Please see pages 5-7 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.

Normal Cost and Employer Rates

	Contributions Expressed as a Percent of Payroll				
Contributions for	**General City**	**D.O.T.**	**DWSD**	**Library**	**System Total**
Normal Cost for 0.5% VPIF (COLA):					
Age & Service Pensions	6.00 %	5.58 %	5.76 %	5.81 %	5.89 %
Disability Pensions	0.62 %	1.00 %	0.66 %	0.59 %	0.68 %
Death-in-Service Pensions	0.29 %	0.29 %	0.32 %	0.24 %	0.29 %
Future Refunds	0.69 %	0.72 %	0.67 %	0.71 %	0.69 %
Administrative Expenses	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %
Total	7.60 %	7.59 %	7.41 %	7.35 %	7.55 %
Members Current Contributions#	4.00 %	4.00 %	4.00 %	4.00 %	4.00 %
Employer Normal Cost (0.5% VPIF)	**3.60 %**	**3.59 %**	**3.41 %**	**3.35 %**	**3.55 %**
Additional Normal Cost for Full 2.0% VPIF##	0.87 %	0.85 %	0.83 %	0.83 %	0.88 %
Employer Normal Cost (2.0% VPIF)	**4.47 %**	**4.44 %**	**4.24 %**	**4.18 %**	**4.43 %**
Fixed Employer Rate#	**5.00 %**	**5.00 %**	**5.00 %**	**5.00 %**	**5.00 %**
Amount Available for UAAL % (0.5% VPIF)	**1.40 %**	**1.41 %**	**1.59 %**	**1.65 %**	**1.45 %**
Amount Available for UAAL % (2.0% VPIF)	**0.53 %**	**0.56 %**	**0.76 %**	**0.82 %**	**0.57 %**
Equivalent Single Amortization Period in Years@*					
0.5% VPIF	11	21	23	18	13
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 in the July 1, 2018 plan year. See comments on pages 5-7 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.*

@ *After reflection of a one-time special employer contribution of $3.1 million as of June 30, 2018. The entire special contribution was allocated to the General City division. If a different allocation is made when the contribution is deposited, results will be adjusted accordingly.*

Development of Liabilities as of June 30, 2017
Retirement System Totals

Valuation Assumptions (1/2% VPIF)

(1)	Present Value of Future Benefits	$	222,424,670
(2)	Present Value of Future Normal Costs		121,552,246
(3)	Actuarial Accrued Liability: (1) - (2)	$	100,872,424
(4)	Accrued Assets		62,922,324
(5)	Unfunded Actuarial Accrued Liability (UAAL): (3) - (4)	$	37,950,100
(6)	**Additional Amount for 2% VPIF**		**11,234,351**
(7)	**UAAL for 2% VPIF: (5) + (6)**	**$**	**49,184,451**

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 $247.4 million and the actuarial accrued liability would be $112.1 million rather than $100.9 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 used 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 5). 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, 2017, the remaining Transition Cost is $28.2 million. This means that of the $38.0 million UAAL shown above (under current valuation assumptions), $9.8 million (at least) will need to be funded by future contributions ($38.0-$28.2).

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: 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*	Contributions Effective Fiscal Year	Employer Contribution Type#
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%	TBD	TBD	2018/19	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 by June 30, 2018 in an effort to improve the funding position of the System.

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 12. The projections are based on the assumptions and methods adopted by the Board, as detailed on page 12. The results of the projections are shown on page 14 and indicate that the plan is projected to be 100% funded in five years. Since the projected funded status is equal to 100% in five years, we believe Board action described under Section 9.5 (1) of the plan may not 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 15 for convenience.

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 favorable in the year ending June 30, 2017. The plan experienced a net gain of $1.5 million consisting of liability loss of $1.9 million and asset gains of $3.4 million. The liability losses were driven in large part by significantly higher payroll than expected largely offset by gains due to more turnover than expected (796 terminations vs. 286 expected). Additional information about gains and losses is shown on page 11.

New hires entering the plan were older than new hires in previous years, resulting in an increase in the average entry age of each division (except DWSD). As a result, the employer normal cost increased by 0.12% 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.

Comment 4 - 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 3.55% of payroll by 1.15% of payroll (when the normal cost rate is based on the valuation assumption of 0.5% VPIF).

	(1) Employer Normal Cost Rate	(2) Employer Rate	(3) Excess (2)-(1)	(4) UAAL	(5) Amortization Period
Valuation Assumptions (0.5% VPIF)	3.55%	5.00%	1.45%	$ 38.0 mill.	13
Full 2% VPIF	4.43%	5.00%	0.57%	$ 49.2 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, 2017, no such transfers have been made. For purposes of this valuation, future transfers were assumed not to occur.

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 5 – Administrative Expenses

The results in this report assume an investment return rate of 6.75%, net of administrative expenses. For FY 2017, 71% of the General Retirement System administrative expenses were allocated (by Retirement System staff) to Component II (Legacy) and the remaining 29% was allocated to Component I (Hybrid). As an indication of the magnitude, the FY 2017 Component I administrative expenses were approximately 4.2% of the FY 2017 Component I market value of assets. As a result, administrative expenses may put downward pressure on the Component I funded status in the short term.

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. Furthermore, combined Component I (Hybrid) and Component II (Legacy) administrative expenses for the 2017 fiscal year are approximately 30% higher when compared to the 2016 fiscal year. We understand that this increase is temporary. Historically, the total administrative expenses as a percent of the Combined Plan (Component I and Component II) assets were approximately 30 basis points.

Comment 6 – ASF Transfers

A simple estimate of the future ASF transfers that could be made follows. As of June 30, 2017, the ASF balance totaled $121 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 understand that the System has determined that no excess ASF interest was to be transferred in the year ending June 30, 2018, so we assume the first transfer occurs the next year. 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 $5.5 million, well short of the $38.2 million remaining Transition Cost.

Based on the investment performance for the year ending June 30, 2017, we expect a transfer to occur in FY 2019 in excess of the 1.50% estimate above. We have estimated the FY 2019 transfer to be approximately $5.9 million. This transfer will be included in the valuation (and the 5-year projection) once it occurs.

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 7

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 8 - 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, FY 2016, and FY 2017 be credited to the RSF.

Comment 9 – Additional Employer Contribution

The City has elected to make an additional contribution (above what is required by the Plan) of $3.1 million on or before June 30, 2018 to improve the Plans funding status. We commend the City's decision. This anticipated contribution has been taken into account in determining the current amortization periods and 5-year projection. However, it is not reflected in the assets or UAAL reported as of June 30, 2017, since it will be contributed after the valuation date.

SECTION B

FUNDING RESULTS

Actuarial Liabilities
as of June 30, 2016

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	$ 145,340,413	$ 73,046,330	$ 72,294,083
Disability benefits likely to be paid to present active members	13,668,321	11,412,597	2,255,724
Death-in-service benefits likely to be paid on behalf of present active members	6,274,750	4,434,662	1,840,088
Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active members	29,142,319	32,658,657	(3,516,338)
Benefits attributed to voluntary member contributions	14,413,593	0	14,413,593
Reserve for Refunds Due	0	0	0
Benefits likely to be paid to vested inactive members	9,718,475	0	9,718,475
Benefits to be paid to current retirees, beneficiaries, and future beneficiaries of current retirees (including annuities)	3,866,799	0	3,866,799
Total (0.5% VPIF)	$ 222,424,670	$ 121,552,246	$ 100,872,424
Actuarial Value of Assets	$ 62,922,324	$ 0	$ 62,922,324
Liabilities to be covered by Future Contributions	$ 159,502,346	$ 121,552,246	$ 37,950,100
Additional Amount for Full (2.0%) VPIF	25,003,694	13,769,343	11,234,351
Liabilities to be covered by Future Contributions for Full VPIF	$ 184,506,040	$ 135,321,589	$ 49,184,451

Actuarial Balance Sheet
(0.5% VPIF)

Assets and Present Value of Expected Future Contributons

Valuation Date (June 30):	2017
A. Present Actuarial Value of Assets	
1. Net assets from System financial statements	$ 62,922,324
2. Adjustment for Valuation Assets	0
3. Actuarial Value of Assets	62,922,324
B. Actuarial Present Value of Expected Future Employer Contributions	
1. For Normal Costs	56,566,765
2. For Unfunded Actuarial Accrued Liability	37,950,100
3. Total	94,516,865
C. Actuarial Present Value of Expected Future Member Contributions	64,985,481
D. Total Present and Expected Future Resources	$ 222,424,670

Present Value of Expected Future Benefit Payments

A. To Retirees and Beneficiaries (Including Annuities)	$ 3,866,799
B. To Vested Terminated Members	9,718,475
C. To Present Active Members	
1. Allocated to Service Rendered Prior to Valuation Date – Actuarial Accrued Liability	72,873,557
2. Allocated to service likely to be rendered after valuation date	121,552,246
3. Total	194,425,803
D. Voluntary Member Contributions	14,413,593
E. Total Actuarial Present Value of Expected Future Benefit Payments	$ 222,424,670

Liability by Division
($ in thousands)

Present Value, June 30 of	General	D.O.T.	DWSD	Library	Totals
Accrued Pension Liabilities					
Retirees and beneficiaries	$ 2,344	$ 202	$ 867	$ 156	$ 3,569
Inactive members future deferred pensions	3,236	1,450	4,833	199	9,718
Active members	47,122	12,146	8,592	5,013	72,873
Total accrued pension liabilities	52,702	13,798	14,292	5,368	86,160
Pension fund balances	30,353	6,519	8,805	2,832	48,509
Additional Amount for Full VPIF	6,901	1,814	1,823	697	11,236
Full VPIF accrued liability	59,603	15,612	16,115	6,065	97,396
Accrued Annuity Liabilities (Due to Voluntary Member Contributions)					
Retirees and beneficiaries	$ 296	$ 1	$ 0	$ 0	$ 297
Members annuities & future refunds	7,401	4,710	2,271	32	14,414
Total accrued annuity liabilities	7,697	4,711	2,271	32	14,711
Annuity fund balances	7,401	4,710	2,271	32	14,414
Unfunded accrued annuity liabilities	296	1	0	0	297
Totals					
Actuarial Accrued Liabilities	$ 60,399	$ 18,509	$ 16,563	$ 5,400	$ 100,871
Accrued Assets*	37,754	11,229	11,076	2,864	62,923
Funded Ratio	62.5%	60.7%	66.9%	53.0%	62.4%
Unfunded Actuarial Accrued Liabilities (0.5% VPIF)	**$ 22,645**	**$ 7,280**	**$ 5,487**	**$ 2,536**	**$ 37,948**
Additional Amount for Full (2.0%) VPIF	**6,901**	**1,814**	**1,823**	**697**	**11,236**
UAAL at Full VPIF	**$ 29,547**	**$ 9,094**	**$ 7,310**	**$ 3,233**	**$ 49,184**

**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)	$ 77,481,678	$ 36,253,555	$ 41,228,123
(2) Total Normal Cost*	17,852,273	N/A	17,852,273
(3) Total Contributions	N/A	22,280,396	(22,280,396)
(4) Benefit Payments and Refunds	(2,134,809)	(2,134,809)	-
(5) Interest 6.75% x (1) + 6.75% x [(2) + (3) + (4)] / 2	5,760,478	3,127,029	2,633,449
(6) Expected End of Year (1)+(2)+(3)+(4)+(5)	$ 98,959,620	$ 59,526,171	$ 39,433,449
(7) Actual End of Year	100,872,424	62,922,324	37,950,100
(8) Gain or Loss (6)-(7)	$ (1,912,804)	$ (3,396,153)	$ 1,483,349
	Loss	Gain	Gain
(9) Percent of BOY AAL (9)/(1A)	(2.47)%	(4.38)%	1.91%

** 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	$ (1.1)	(1.4)%
Risks Related to Assumptions		
Economic Risk Areas:		
Pay Increases^	(5.5)	(7.1)%
Investment Return	3.4	4.4 %
VPIF	0.0	0.0 %
Demographic Risk Areas:		
Full and Reduced Service Retirements	(1.0)	(1.3)%
Death Benefits	(0.1)	(0.1)%
Disability Benefits	0.0	0.0 %
Other Terminations	5.7	7.3 %
Post-Retirement Mortality	0.0	0.0 %
Other	0.0	0.0 %
Total Gain (or Loss) During Period	1.5	1.9 %

**Results are approximate due to limitations in data.*
#Beginning of year liabilities were $77.5 million.
^Includes impact of changes in the total payroll due to changes in active group size, new hires, and retirees.

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 During Fiscal Year Dollars	Transition Cost at End of Year
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)

		A	B	C = (A - B)	D	E = (D/C)
Valuation Date June 30,	**Fiscal Year June 30,**	**Total AAL**	**Transition Cost**	**Net AAL**	**Assets**	**Net Funded Ratio**
2017	2018	$ 97,128,694	$ 28,214,968	$ 68,913,726	$ 62,922,324	91%
2018	2019	125,230,970	24,245,704	100,985,266	98,379,757	97%
2019	2020	154,641,175	20,008,516	134,632,658	132,692,022	99%
2020	2021	185,756,547	15,485,318	170,271,230	169,102,311	99%
2021	2022	218,796,450	10,656,803	208,139,647	207,854,102	100%
2022	2023	253,943,054	5,502,364	248,440,690	249,156,264	**100%**

Comment 1: Based on this projection, the Funded Status is at or above 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 not 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: The projection above includes an additional employer contribution of $3.1 million on June 30, 2018.

Comment 4: Based on the investment performance for the year ending June 30, 2017, we have estimated that a transfer to fund Transition Costs of approximately $5.9 million (2017 dollars) due to the "excess interest on ASF balances could be received." The actual transfer will be reflected in the projection once it is reported in the assets (actually transferred).

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, 2017	June 30, 2016
A. Cash and cash equivalents	$ 5,703,254	$ 12,813,262
B. Receivables:		
1. Accrued investment income	52,054	16,784
2. Contributions	2,525,993	0
3. Receivables from investment sales	216,258	148,558
4. Other	0	0
5. Total Receivables	$ 2,794,305	$ 165,342
C. Investments		
1. Global equities	$ 31,203,254	$ 12,263,170
2. Global fixed income	3,040,784	1,432,912
3. Real assets	9,893,216	6,042,403
4. Private equity	2,549,069	1,479,190
5. Diversifying strategies	8,360,978	3,607,571
6. Total Investments	$ 55,047,301	$ 24,825,246
D. Other Assets	$ 2,340,478	1,596,118
E. Liabilities	$ 2,963,014	$ 3,146,413
F. Total Market Value of Assets Available for Benefits	$ 62,922,324	$ 36,253,555
G. Voluntary Member Contributions	$ 14,413,593	$ 10,198,653
H. Market Value Net of Voluntary Member Contributions	$ 48,508,731	$ 26,054,902
I. Allocation of Investments		
1. Cash and cash equivalents	12.52 %	31.52 %
2. Global equities	49.59 %	33.83 %
3. Global fixed income	4.83 %	3.95 %
4. Real estate	15.72 %	16.67 %
5. Private equity	4.05 %	4.08 %
6. Diversifying strategies	13.29 %	9.95 %
7. Total Investments	100.00 %	100.00 %

Reconciliation of Plan Assets

Item		June 30, 2017		June 30, 2016
A. Market Value of Assets at Beginning of Year	$	36,253,555	$	20,096,898
B. Revenues and Expenditures				
1. Contributions				
a. Member Contributions	$	12,795,404	$	12,559,259
b. Employer Contributions		9,484,992		9,048,831
c. State Contributions		0		0
d. Purchased Service Credit		0		0
e. Total	$	22,280,396	$	21,608,090
2. Investment Income				
a. Interest, Dividends, and Other Income	$	1,015,308	$	454,901
b. Net Realized and Unrealized Gains/(Losses)		8,376,107		(392,150)
c. Investment Expenses		(290,673)		(132,773)
d. Net Investment Income	$	9,100,742	$	(70,022)
3. Benefits and Refunds				
a. Refunds	$	1,846,519	$	2,247,052
b. Regular Monthly Benefits		288,290		40,162
c. Partial Lump-Sum Benefits Paid		0		0
d. Other		0		0
e. Total	$	2,134,809	$	2,287,214
4. Administrative and Miscellaneous Expenses	$	2,639,393	$	3,094,197
5. Other	$	61,833	$	0
6. Transfers	$	0	$	0
C. Market Value of Assets at End of Year	$	62,922,324	$	36,253,555

SECTION E

PARTICIPANT DATA

Active Members

A)	Count reported on file	6,754
B)	Deferreds (Terminated but Vested) - Status = "F"	(835)
C)	No date of hire on file	(9)
D)	No salary on file	(17)
E)	Hired after the valuation date	(194)
F)	Non-active status	(379)
G)	Non-eligible class code & bargaining unit	(171)
H)	Agency "88"	(32)
I)	Number of records to value	5,117

Inactive Vested Members

A)	Number of records reported on data file	3,326
B)	In Legacy active file but not otherwise in database and not in Hybrid active file	72
C)	Valued as inactive in prior year and would not have otherwise been valued this year	374
D)	Valued as a vested active member in prior but not in this year's active file and would not have otherwise been valued this year	132
E)	Non-eligible bargaining unit	(46)
F)	In General file with Police and Fire Revenue Group	(49)
G)	In Police and Fire file with General Revenue Group	18
H)	Valued as Hybrid Retiree	-
I)	Other Changes	(4)
J)	Duplicate Records	-
K)	Less than 10 years of service	(297)
L)	Zero mandatory contribution balance	(2,561)
M)	Terminated before 6/30/2014	(32)
N)	Number of records to value	933

Retired Members and Beneficiaries

A)	Number of records reported on data file:	42,360
B)	Number of records in P/F Plan:	(15,724)
C)	Records not currently in receipt of benefits:	(14,602)
D)	Component II (Legacy) records:	(11,834)
E)	Number of records valued:	200

Data Adjustments

Inactive vested members for Component I (Hybrid) have not been processed by System staff. These members were valued in the following ways:

- If available, Component II deferred vested data was used;
- If Component II deferred vested data was not available, active data from prior years was used. In this case, it was assumed that members terminated at the end of the fiscal year.
- Benefit service was calculated by the time elapsed from June 30, 2014 to the termination date.
- 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. For non-equated members that elected a pop-up benefit, the pop-up amount is estimated based on the chosen option and benefit amounts provided in the data. Benefits for dependent children are assumed to cease at age 21.

Please see our 2017 data summary letter dated April 2, 2018 for additional details.

	Active		Term. Vested	Retirees		Totals
	Count	Pay	Count	Count	Monthly Benefits	Count
2016	**4,235**	**$169,014,411**	**1,073**	**125**	**$9,964**	**5,433**
Change in Pay/Pensions	N/A	20,918,582	N/A	N/A	(649)	
New	1,484	59,816,863	145			1,629
New Beneficiary				4	1,447	4
Retired	(39)	(1,744,028)	(31)	76	17,534	6
Non-Duty Disabled				-	-	-
Duty Disabled				-	-	-
Death/Off			(217)	(4)	(234)	(221)
Vested Terminated	(242)	(9,231,622)	189			(53)
Non-Vested Terminated	(548)	(18,721,042)				(548)
Rehired	227	9,901,187	(226)	(1)	(88)	-
Data Adjustment	-	-	-	-	-	-
2017	**5,117**	**$229,954,351**	**933**	**200**	**$27,974**	**6,250**

Summary of Member Data
June 30, 2017

Active Members

	General	D.O.T.	DWSD	Library	Totals
Number	3,331	1,040	464	282	5,117
% Change in active members from prior year	29.1 %	26.2 %	(16.2)%	2.2 %	20.8 %
Annual payroll ($ millions)*	$ 159.0	$ 36.3	$ 22.7	$ 11.9	$ 230.0
Average pay	$47,744	$34,892	$48,979	$42,211	$44,939
% Change in average pay from prior year	15.5 %	5.8 %	13.0 %	4.9 %	12.6 %
Average age	45.4	47.4	48.7	51.0	46.4
Average eligibility service	10.1	11.8	14.9	17.1	11.3

Retired Members

	General	D.O.T.	DWSD	Library	Totals
Number	81	22	84	13	200
Annual benefits including annuities as report	$239,794	$21,786	$82,724	$13,788	$358,092
Average benefits as reported	$ 2,960	$ 990	$ 985	$ 1,061	$ 1,790
% Change in average benefit	168.3 %	43.4 %	4.7 %	36.9 %	87.0 %

*Inactive Members**

	General	D.O.T.	DWSD	Library	Totals
Number	297	105	503	28	933
Average FAC	$ 49,699	$ 61,853	$ 57,477	$40,629	$ 54,988
Average service	2.0	2.0	1.5	1.8	1.7
Annual benefits (estimated)	$442,150	$196,441	$674,939	$27,376	$1,340,906
Average benefits (estimated)	$ 1,489	$1,871	$1,342	$978	$1,437
% Change in average service	17.6 %	25.0 %	0.0 %	63.6 %	6.3 %
% Change in average FAC	(2.1)%	18.2 %	(2.8)%	(10.5)%	0.0 %

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

Active Members as of June 30, 2017
by Attained Age and Years of Service
Retirement System Totals

	Years of Service to Valuation Date							Totals	
Attained Age	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
Under 20	38							38	$ 942,280
20-24	183	1						184	4,953,533
25-29	378	12	1					391	14,113,205
30-34	329	46	19	1				395	16,945,191
35-39	294	44	63	55	2			458	20,114,781
40-44	263	63	74	94	50	2		546	24,982,598
45-49	277	54	84	172	140	38	3	768	35,853,084
50-54	210	42	69	173	187	116	57	854	40,236,041
55-59	174	42	67	143	133	138	117	814	38,640,489
60-64	110	43	42	76	77	66	82	496	24,578,137
65-69	32	12	18	14	10	14	17	117	5,966,519
70-74	8	3	4	9	5	4	8	41	2,015,136
75-79	2	1	4	2	1	2	3	15	613,357
Totals	**2,298**	**363**	**445**	**739**	**605**	**380**	**287**	**5,117**	**$229,954,351**

Group Averages:

Age: 46.4 years
Benefit Service: 1.9 years
Eligibility Service: 11.3 years
Annual Pay: $44,939

Historical Summary of Active Member Data

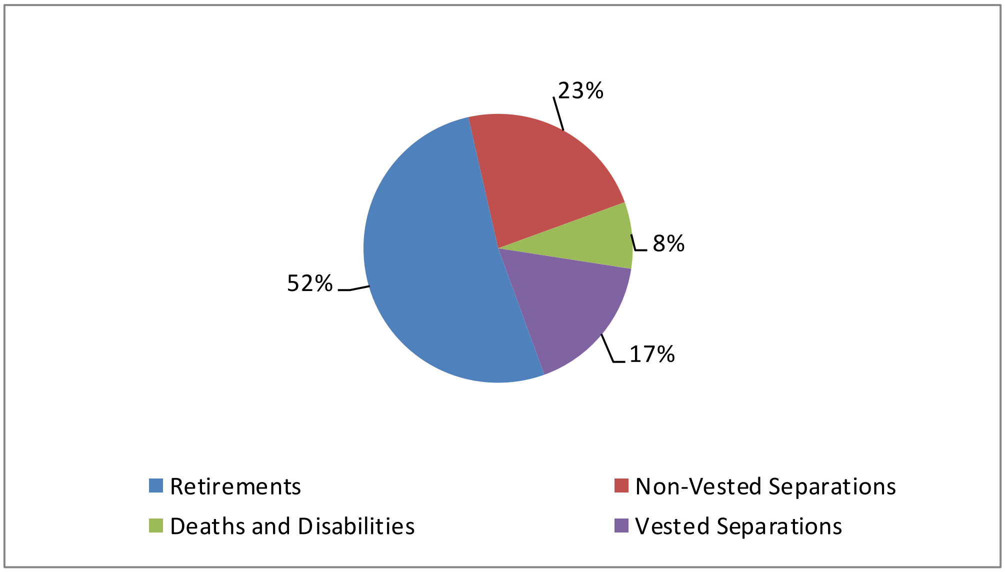
Valuation	Active Members		Covered Payroll		Average Salary		Average		
Date	No.	% Increase	$ Amount	% Increase	$ Amount	% Increase	Age	Service	Entry Age
2014#	4,881	N/A	$ 203,507,079	N/A	$ 41,694	N/A	49.2	16.0	33.2
2015	4,981	2.0%	$ 199,135,119	(2.1)%	$ 39,979	(4.1)%	48.6	15.3	33.3
2016	4,235	(15.0)%	$ 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

\# *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

	June 30, 2017	June 30, 2016
Active Members		
Number	5,117	4,235
Average age (years)	46.4	47.7
Average service (years)	11.3	13.1
Average salary	$44,939	$39,909
Total payroll supplied, annualized	$229,954,351	$169,014,411
Vested Inactive Members		
Number	933	1073
Average age (years)	53.8	52.7
Total calculated deferred benefits ($ millions)	$1.3	$1.4
Average annual deferred benefit (estimated)	$1,437	$1,315
Service Retirees		
Number	195	123
Average age (years)	64.0	63.7
Total annual benefits ($ millions) (excluding annuities)	$0.32	$0.12
Average annual benefit (estimated) (excluding annuities)	$1,625	$954
Disability Retirees		
Number	0	0
Average age (years)	N/A	N/A
Total annual benefits ($ millions) (excluding annuities)	N/A	N/A
Average annual benefit (estimated) (excluding annuities)	N/A	N/A
Beneficiaries (Including death-in-service)		
Number	5	2
Average age (years)	62.3	63.1
Total annual benefits ($ millions) (excluding annuities)	$0.0	$0.0
Average annual benefit (estimated) (excluding annuities)	$3,773	$1,102

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 5,117 active members. Eventually, 1,193 people are expected to terminate covered employment prior to retirement and forfeit eligibility for an employer provided benefit. 3,506 people are expected to receive monthly retirement benefits either by retiring directly from active service, or by retiring from vested deferred status. 418 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 28. Part of the assumption for each age is for a merit and/or seniority increase, and the other recognizes wage inflation (as of June 30, 2014 assumed to be 2.00% for five years, 2.50% for the next five years after that and 3.00% thereafter). The rationale for this assumption is that it is consistent with expectations by the employer used during the plan design.

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 29 and 30. The rationale is based on the 2002-2007 Experience Study modified as necessary to account for the difference in eligibility of the Component I Plan.

The probabilities of separation from service (including *death-in-service* and *disability*) are shown for sample ages on page 32. The rationale is based on the 2002-2007 Experience Study for the Component II Plan.

Sample Salary Adjustment Rates

	Salary Increase Assumptions For an Individual Member		
Sample Ages	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 2017	Future Life Expectancy (years) Men	Women
45	38.51	41.86
50	33.56	36.81
55	28.80	31.91
60	24.26	27.17
65	19.97	22.60
70	15.99	18.30
75	12.37	14.34
80	9.19	10.84

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	Percent of Eligible Active Members Retiring Within Next Year with Unreduced Benefits		
Ages	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	Others: 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.: Ordinary	D.O.T.: Duty	Others: Ordinary	Others: 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 rated 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 than 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.

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.

Age as of July 1, 2014	Normal Retirement Age
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: *A*ge 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.

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

Accrued Service	The service credited under the plan which was rendered before the date of the actuarial valuation.
Actuarial Accrued Liability (AAL)	The difference between the Actuarial Present Value of Future Benefits, and the Actuarial Present Value of Future Normal Costs.
Actuarial Assumptions	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.
Actuarial Cost Method	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.
Actuarial Equivalent	Of equal Actuarial Present Value, determined as of a given date and based on a given set of Actuarial Assumptions.
Actuarial Present Value (APV)	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.
Actuarial Present Value of Future Benefits (APVFB)	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.
Actuarial Valuation	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).
Actuarial Value of Assets	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

Actuarially Determined Employer Contribution	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.
AFC	Average Final Compensation.
Amortization Method	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.
Amortization Payment	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.
Amortization Period	The period used in calculating the Amortization Payment.
APTE	Association of Professional and Technical Employees.
ASF	Annuity Savings Fund of the Component II (Legacy) Plan.
Closed Amortization Period	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.
COLA	Cost of Living Adjustment. Analogous to a VPIF (see VPIF on page 44).
Contribution Budgeting Liability	An expected return-based measure of pension obligation.
D.O.T.	Department of Transportation.
Employer Normal Cost	The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions.
E.M.S.	Emergency Medical Service.

Glossary

Equivalent Single Amortization Period	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.
Experience Gain/Loss	A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two actuarial 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.
Funded Ratio	The ratio of the Actuarial Value of Assets to the Actuarial Accrued Liability.
GASB	Governmental Accounting Standards Board.
GASB No. 67 and GASB No. 68	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.
GLWA	Great Lakes Water Authority.
Normal Cost	The annual cost assigned, under the Actuarial Cost Method, to the current plan year.
Open Amortization Period	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.
POA	The 8th Amended Plan for the Adjustment of the Debt of the City of Detroit.
POC	Pension Obligation Certificates.

Glossary

Reserve Account	An account used to indicate that funds have been set aside for a specific purpose and are not generally available for other uses.
RSF	Rate Stabilization Fund.
SAAA	Senior Accountants, Analysts, and Appraisers Association.
Solvency Liability	A market-based measure of the present value of accrued benefits at a municipal bond discount rate unadjusted for the credit quality of the plan sponsor.
Transition Cost	Initial unfunded liability as described in Section E-16 of the Plan Document.
Unfunded Actuarial Accrued Liability	The difference between the Actuarial Accrued Liability and Actuarial Value of Assets.
Valuation Date	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.
VPIF	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).

The General Retirement System of the City of Detroit

Annual Actuarial Valuation of Component II

June 30, 2017

GRS

GRS Retirement Consulting
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May 1, 2018

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

Dear Board Members:

This report provides key results from the **Annual Actuarial Valuation** of the annuity and pension liabilities of the General Retirement System of the City of Detroit – Component II benefits. The date of the valuation was **June 30, 2017.**

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

The results provided herein relate solely to the Component II benefits. Component I benefits will be the subject of a separate report. The purposes of the valuation are to measure the funding progress of Component II in accordance with the terms of the POA and to provide illustrative actuarially determined contribution amounts, given POA conditions and assumptions for Fiscal Year 2019 for Component II, for comparison with the contribution amounts provided in the POA. The results of the valuation are not applicable for other purposes. In particular, the information provided in this report is not suitable for financial reporting in connection with GASB Statement No. 67. Such information is provided in a separate report. Information regarding potential benefit restoration as allowed for in the POA will also be provided in a separate report, at the Board's request.

The contribution amounts on page 3 include POA stipulated contributions plus two illustrative contribution amounts from alternate funding policies. Users of this report should be aware that contributions made at these amounts do not guarantee benefit security.

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

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

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

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

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

The signing individuals are independent of the plan sponsor.

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

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

Respectfully submitted,

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SECTION A

VALUATION RESULTS

Valuation Results

Required contributions to the Plan through FY 2023 are provided in the POA. Certain agreements (as allowed for in the POA) have resulted in some of the contributions being accelerated. The schedule below details our understanding of the remaining contributions required by the POA.

Contribution Source
($ millions)

	For DWSD Liabilities		For Other Liabilities					
Fiscal Year	**DWSD**	**Transfers**	**UTGO**	**State**	**DIA**	**Other**	**Transfers from DWSD**	**Total**
2018	$ 45.4	$ (2.5)	$ -	$ -	$ 0.4	$ 22.5	$ 2.5	$ 68.3
2019	45.4	(2.5)	-	-	0.4	22.5	2.5	68.3
2020	45.4	(2.5)	-	-	0.4	2.5	2.5	48.3
2021	45.4	(2.5)	-	-	0.4	2.5	2.5	48.3
2022	45.4	(2.5)	-	-	0.4	2.5	2.5	48.3
2023	45.4	(2.5)	-	-	0.4	2.5	2.5	48.3

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

In order to develop divisional valuation results in accordance with POA provisions, we were instructed to allocate the above contributions to the various divisions. This was done by allocating DWSD transfer amounts to the General City division and remaining DWSD contributions to the DWSD division; allocating $2.5 million per year to the Library; and allocating remaining contributions to DOT and General in proportion to their unfunded liabilities.

The chart below shows this allocation.

	General	**D.O.T.**	**Subtotal**	**Library**	**DWSD**	**Totals**
	$ Thousands					
Unfunded Liabilities	$ 508,947	$ 235,593	$ 744,540	$ 17,579	$ 266,944	$ 1,029,064
% of Subtotal	68.4%	31.6%	100.0%	N/A	N/A	
FY 2018 Contributions	$ 13,928	$ 6,447	$ 20,375	$ 2,500	$ 45,400	$ 68,275
Transfers	$ 2,500	$ -	$ 2,500	$ -	$ (2,500)	$ -
FY 2018 UAAL Contributions	**$ 16,428**	**$ 6,447**	**$ 22,875**	**$ 2,500**	**$ 42,900**	**$ 68,275**

A different allocation procedure would produce different results. If a different allocation procedure should be used, please let us know and we will revise this report.

Valuation Results (Continued)

Unfunded Actuarial Accrued Liability (UAAL)+

	($ millions)				
	General City	D.O.T.	DWSD	Library	System Total
UAAL as of June 30, 2017	$ 508.9	$ 235.6	$ 266.9	$ 17.6	$ 1,029.1
Anticipated POA Contribution (EOY)	16.4	6.4	42.9	2.5	68.3
Anticipated Expenses@	-	-	-	-	-
Interest at 6.75%	34.4	15.9	18.0	1.2	69.5
Projected UAAL as of June 30, 2018	$ 526.9	$ 245.0	$ 242.1	$ 16.3	$ 1,030.3
Anticipated POA Contributions for FY2019	**16.4**	**6.5**	**42.9**	**2.5**	**68.3**
Estimated Employer Contributions for FY 2024 #!					
Alternate 1:Level Principal	**$ 70.3**	**$ 33.4**	**$ 9.1**	**$ 0.8**	**$ 113.5**
Alternate 2:Level Dollar##	**$ 54.8**	**$ 26.0**	**$ 7.1**	**$ 0.6**	**$ 88.5**

Totals may not add due to rounding.

+ *Unfunded Actuarial Accrued Liability.*

@ *In accordance with Plan Document, the mandated 6.75% rate of return is net of investment and administrative expenses.*

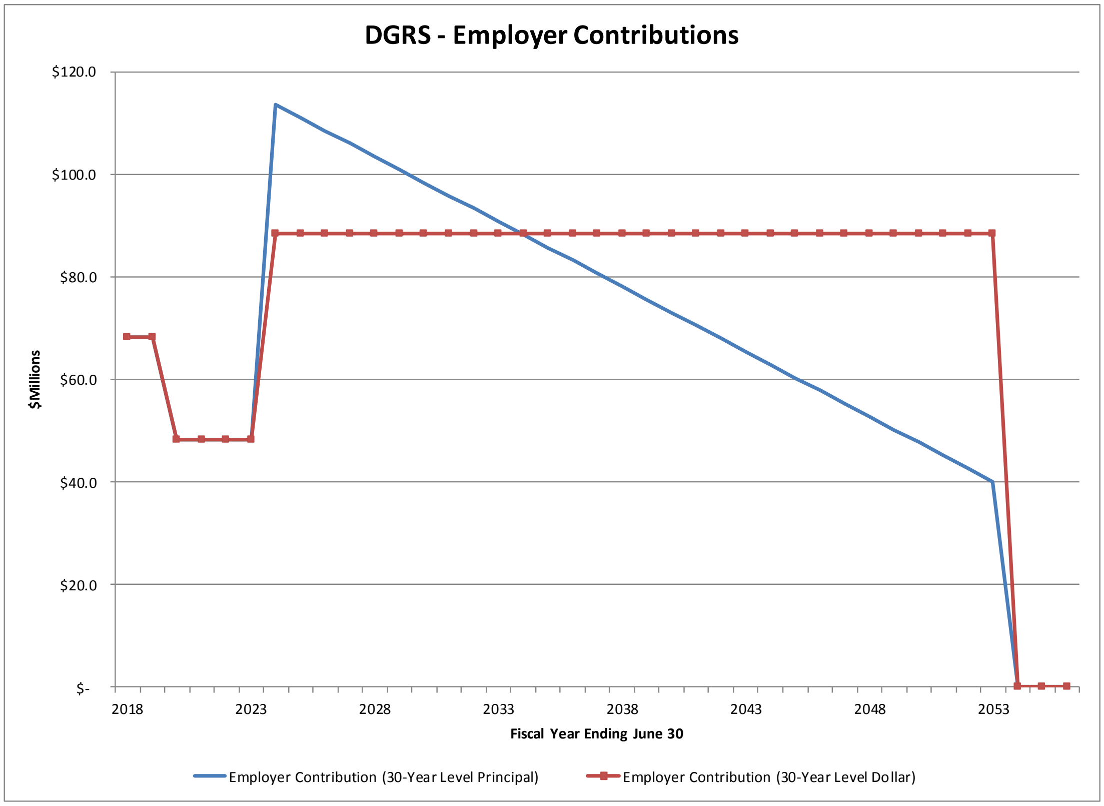
Assuming the POA contributions through 2023 and a 30-year closed amortization thereafter. When determining the Fiscal Year 2024 illustrative amounts, only the total contributions and the DWSD contributions are stipulated in the POA. The remaining amounts were allocated to the other groups as described on page 1. A different allocation would result in different results by group.

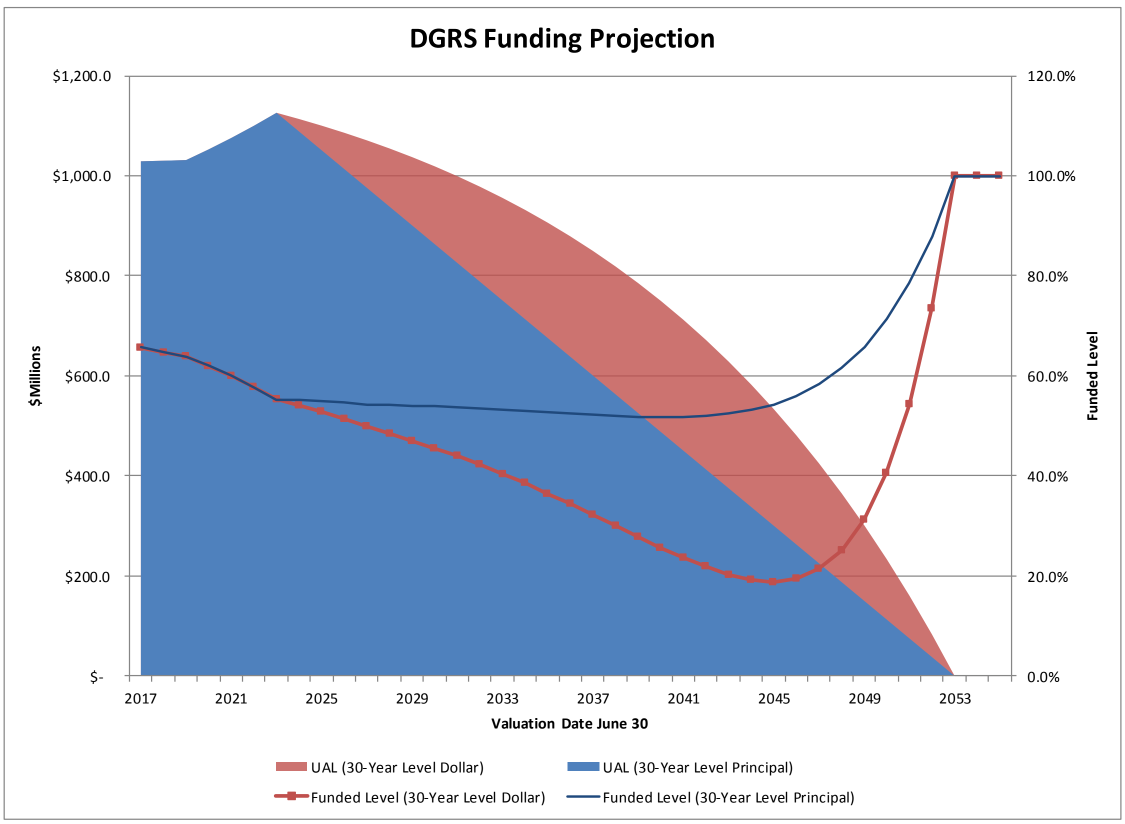
! *Total employer contributions, including amounts paid by employer but funded from other sources as required by POA.*

Contributions at this level may not be sufficient to prevent fund depletion prior to satisfaction of all liabilities. Included at System's request.

The POA contributions result in a defunding of the plan between now and June 30, 2023, which was contemplated by the POA. In fact, the anticipated POA contributions do not project benefit restoration even if all assumptions are met (including the POA mandated assumed rate of return of 6.75%). Also, the 2018 to 2023 contributions are less than the amount of nominal interest that accrues on the UAAL. The Estimated Employer Contribution for FY 2024 is based on a projection of results assuming only the POA contributions are made and all future experience between the valuation date and FY 2024 is as assumed. Actual experience will result in changes to this estimate and the final result (from the June 30, 2022 actuarial valuation) could be materially different than shown above.

We understand that the City has set aside additional money to be contributed to the pension plans in the future. This potential additional contribution has not been taken into account in this valuation.





Notes: 30-year amortization periods are assumed to begin in FY 2024.
30-year level dollar may result in fund depletion and pay-as-you-go funding before the end of the 30-year period.

Valuation Results (Continued)

We have recommended that the Board establish a funding policy for the contribution determinations on and after fiscal year 2024. The Board has accepted this recommendation and has begun the process. Once that process has been completed we will incorporate the adopted policy in future valuation reports. Until that process is completed, we will continue to show the following two possible policies.

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

Funding Policy 1 is based on amortizing the UAAL over the average remaining service life of active members (8 years for general; 6 years for DOT; 7 years for DWSD; and 7 years for Library) using level dollar amortization.

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

Illustrative Contribution Shortfall

	($ millions)				
	General City	D.O.T.	DWSD	Library	System Total
(1) Illustrative Contribution for FY 2019 (Funding Policy 1)	$ 87.4	$ 51.0	$ 44.5	$ 3.0	$ 185.9
(2) Illustrative Contribution for FY 2019 (Funding Policy 2)	53.1	24.7	24.4	1.6	103.9
(3) Actual Contributions for FY 2019 (POA)	16.4	6.5	42.9	2.5	68.3
Fiscal Year 2019 Shortfall - Funding Policy 1: (1) - (3)	$ 71.0	$ 44.5	$ 1.6	$ 0.5	$ 117.6
Fiscal Year 2019 Shortfall - Funding Policy 2: (2) - (3)	$ 36.7	$ 18.2	$ (18.5)	$ (0.9)	$ 35.6

We understand the Employer has set aside money to contribute to the Pension Plans in the future. Since the portion of the fund this Plan will receive has not been determined, we have not taken those assets into account in our calculations. We commend the Employer for taking proactive steps to manage the estimated increase in funding requirements beginning in FY 2024. In the meantime, we recommend continued consideration of increasing contributions actually deposited into the trust.

In addition, as the Board works through the funding policy, we would suggest considering a funding period less than 30 years. Given the fact that not all of the retiree liabilities are funded, a period of 15 years or less should be considered.

Valuation Results (Concluded)

Present Value	June 30, 2017	June 30, 2016
Accrued Pension Liabilities (Employer Financed)		
Retirees and beneficiaries	$2,182,334,703	$2,194,305,695
Inactive members future deferred pensions	269,387,584	305,393,499
Active members	311,667,455	272,852,100
Total accrued pensions	2,763,389,742	2,772,551,294
Pension fund balances	1,839,375,685	1,775,122,658
Unfunded accrued pension liabilities	$ 924,014,057	$ 997,428,636
Accrued Annuity Liabilities (Member Financed)		
Retirees and beneficiaries Future annuities	$ 111,482,100	$ 113,362,921
Member annuities & future refunds	120,921,554	146,377,716
Total accrued annuity liabilities	232,403,654	259,740,637
Annuity fund balances	127,353,290	158,418,649
Unfunded accrued annuity liabilities*	$ 105,050,364	$ 101,321,988
Totals		
Actuarial Accrued Liabilities	**$2,995,793,396**	**$3,032,291,931**
Market Value of Assets	**1,966,728,975**	**1,933,541,307**
Unfunded Actuarial Accrued Liabilities	**$1,029,064,421**	**$1,098,750,624**

** Liabilities are gross before accounting for ASF claw-back. Assets currently include a receivable of approximately $105.6 million related to the ASF claw-back. We believe the receivable is included in the Pension fund balances.*

Funded Ratio - POA

		Defined Benefit	ASF	Total
A	Actuarial Accrued Liability	$2,874,871,842	$120,921,554	$2,995,793,396
B	Market Value of Assets	$1,845,807,421	$120,921,554	$1,966,728,975
C	Unfunded Actuarial Accrued Liability (A-B)	$1,029,064,421	$ 0	$1,029,064,421
D	Funded Ratio (B/A)	64.2%	100.0%	65.6%

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

Funded Ratio - Solvency

		Defined Benefit	ASF	Total
A	Market-Based Liability	$3,982,786,305	$120,921,554	$4,103,707,859
B	Market Value of Assets	$1,845,807,421	$120,921,554	$1,966,728,975
C	Unfunded Actuarial Accrued Liability (A-B)	$2,136,978,884	$ 0	$2,136,978,884
D	Funded Ratio (B/A)	46.3%	100.0%	47.9%

The Solvency Funded Ratio is a market-based measurement of the pension obligation. It estimates the amount the plan would need to invest in low risk securities to provide the benefits with greater certainty. For this purpose, the solvency liability is computed at 3.56% interest as of June 30, 2017, based on the long-term municipal bond rate ("20-Year Municipal GO AA Index" rate from the Fidelity Index as of June 30, 2017). We are not able to assess the credit quality of the plan sponsor and, as such, no adjustment has been made for the credit quality of the plan sponsor. This measure may not be appropriate for assessing the need for or amount of future contributions. This measure may not be appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligation.

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

Comments

Experience

Experience was more favorable than assumed during the year ending June 30, 2017. The chart below shows the estimated gain by division.

Development of Actuarial Gain/(Loss)

	($ millions)				
	General City	D.O.T.	DWSD	Library	System Total
(1) UAAL as of June 30, 2016 (BOY)	$ 561.9	$ 199.0	$ 315.3	$ 22.5	$ 1,098.8
(2) Actual POA Contribution (EOY)	45.4	0.1	42.9	2.8	91.2
(3) Interest at 6.75%	37.9	13.4	21.3	1.5	74.2
(4) Projected UAAL* as of June 30, 2017	$ 554.5	$ 212.3	$ 293.6	$ 21.2	$ 1,081.7
(5) Actual UAAL* as of June 30, 2017	508.9	235.6	266.9	17.6	1,029.1
Gain (Loss): (4) - (5)	$ 45.5	$ (23.2)	$ 26.7	$ 3.6	$ 52.6
Gain (Loss) From Investments	$ 48.3	$ 9.2	$ 25.5	$ 3.0	$ 86.0
Gain (Loss) From Liabilities	$ (2.8)	$ (32.4)	$ 1.1	$ 0.6	$ (33.4)

** Unfunded actuarial accrued liability.*

Source of Actuarial Gain/(Loss)

	Gain (Loss) in Period	
Type of Risk Area	Totals ($ in millions)	Percent of Liabilities
Data Improvements*	(43.3)	(1.5)%
Risks Related to Assumptions		
Economic Risk Areas:		
Investment Return	86.0	3.0 %
Demographic Risk Areas:		
Full and Reduced Service Retirements	4.4	0.2 %
Death Benefits^	0.1	0.0 %
Disability Benefits	(0.2)	0.0 %
Other Terminations	3.5	0.1 %
Post-Retirement Mortality	2.1	0.1 %
Total Gain (or Loss) Related to Assumptions	95.9	3.3 %
Total Gain (or Loss) During Period	52.6	1.8 %
Beginning of Year Accrued Liabilities	2,885.9	100.0 %

** Including adjustments to modeling as a result of improved data.*
^ Estimate may not be accurate due to limitations related to data.

Comments (Continued)

Experience (Continued)

The estimated FY 2024 contributions are very sensitive to changes in year-to-year experience. The chart below reconciles our estimate from the June 30, 2016 valuation to our estimate from this valuation (June 30, 2017).

Reconciliation of Projected June 30, 2024 Contributions – Level Principal

	($ millions)				
	General City	D.O.T.	DWSD	Library	System Total*
Estimated FY 2024 Employer Contribution (Level Principal) from 6/30/16 Valuation	$ 78.4	$ 28.5	$ 13.1	$ 1.4	$ 121.5
Experience Gain (Loss) of $52.6 Million	(6.8)	3.5	(4.0)	(0.5)	(7.9)
Modified Contributions (see below)	0.8	(0.1)	-	-	0.6
Actual FY 2017 Contribution above Expected	(2.1)	1.5	-	(0.1)	(0.7)
Estimated FY 2024 Employer Contribution (Leval Principal) from 6/30/17 Valuation	$ 70.3	$ 33.4	$ 9.1	$ 0.8	$ 113.5

**Totals may not add due to rounding.*

Reconciliation of Projected June 30, 2024 Contributions – Level Dollar

	($ millions)				
	General City	D.O.T.	DWSD	Library	System Total*
Estimated FY 2024 Employer Contribution (Level Dollar) from 6/30/16 Valuation	$ 61.1	$ 22.2	$ 10.2	$ 1.1	$ 94.6
Experience Gain (Loss) of $52.6 Million	(5.3)	2.7	(3.1)	(0.4)	(6.1)
Modified Contributions (see below)	0.6	(0.1)	-	-	0.5
Actual FY 2017 Contribution above Expected	(1.7)	1.2	-	-	(0.5)
Estimated FY 2024 Employer Contribution (Level Dollar) from 6/30/17 Valuation	$ 54.8	$ 26.0	$ 7.1	$ 0.6	$ 88.5

**Totals may not add due to rounding.*

Modified Contributions

We understand that the UTGO scheduled contributions for FY 2018 were accelerated to FY 2017. See page 9 for additional comments on allocation.

ASF Claw-Back Data

For the June 30, 2015 valuation, the Systems auditors determined a receivable in accordance with GAAP accounting that was included in the reported June 30, 2015 assets. The reported assets for the June 30, 2017 status valuation also included a receivable for the remaining claw-back payments. While we did not audit any of the assets, we reviewed the change in this receivable for reasonableness.

Annuity Reserve Fund (ARF)

In general, assets were reviewed for reasonableness. During that review, we discovered that the ARF was not credited any interest. As a result, we recommend that all the reserve amounts be reviewed.

Comments (Continued)

Plan Provisions

Section B-1 (b) of the plan provides that members who terminate employment and are subsequently rehired before incurring a six-year break in service are eligible to earn additional vesting and eligibility service under the plan. For purposes of this valuation, we have assumed no terminated members are rehired.

Great Lakes Water Authority (GLWA) Members

The Retirement System does not currently identify GLWA employees. The DWSD division had a large number of terminations in 2016. We have discussed with the Board's legal counsel whether or not GLWA employees are considered active members for purposes of Component II and do not have a definitive answer. We have treated these numbers as terminated members who are entitled to either a vested deferred benefit or a refund of ASF contributions. We recommend the Board's legal counsel research this point. If it is determined that these members are still active and are continuing to earn vesting and eligibility service under the plan, then we recommend the Retirement System work with GLWA to identify these members.

For this valuation (6/30/2017) we received a separate file indicating the June 30, 2014 DWSD status of members. Any members that were indicated as being DWSD division members on that file were valued under the DWSD for this valuation, regardless of the division reported on the main valuation data (which we understand to be the division as of June 30, 2017 in the Component I plan).

Allocation of Contributions between General and DOT

Our understanding of the allocation of contributions between General and DOT is discussed on page 1 of this report. Based on the reported assets, a different allocation method appears to have been used in FY2017. If the System supplies us with this asset method actually used, we can incorporate that method in future valuations.

Magnitude of Administrative Expenses

Combined Component I (Hybrid) and Component II (Legacy) administrative expenses for the 2017 fiscal year are approximately 30% higher when compared to the 2016 fiscal year. We have been informed that this increase is temporary.

Data Changes

System staff has undertaken several data improvement projects (some specifically discussed in other comments herein). As these data improvements are provided to us in the valuation data, we have removed earlier adjustments and approximations. These improvements are the primary source of the liability losses shown on page 7. In particular, the data review process seems to indicate that new AFC amounts for DOT were larger then reported annual compensation due to overtime included in AFC that was not included in reported compensation. As data continues to improve, additional liability gains and losses may result in future valuations.

Comments (Continued)

Annuity Savings Fund (ASF) Interest Credits

The ASF fund is credited with the lesser of 5.25% interest and the total fund earnings. We understand that any earning in excess of 5.25% (that otherwise would have been credited to the ASF fund if not for the 5.25% cap) will be transferred to Component I assets, to the extent needed, for funding of transition liability. Since ASF liabilities are equal to ASF balances, we did not model any such future excess earnings as part of this valuation. However, since the fund earned approximately 11% during FY 2017, we expect that there will be a transfer of excess ASF interest in FY 2019 related to this year's performance. Approximately $5.9 million was added to the liabilities in this report to account for anticipated excess earnings expected to occur as a result of return on assets in the 2017 fiscal year. We have discussed this additional liability with the Plan's accountants and have been instructed that the excess earnings should not be included as a liability in the GASB 67 and 68 reports.

Census Data and Approximations

We understand that data provided this year contained new estimates of the 2014 frozen AFC for active members. Benefit calculations we collected for members who retired on or after 7/1/2017 support the 2017 reported AFC as being more accurate. We have therefore removed the AFC load that was used in prior valuations. However, the AFC provided for this valuation appeared to be unreasonably small for a portion of the population. Therefore, in cases where the AFC reported for this valuation was less than 75% of the AFC reported in the 2014 valuation, the AFC as reported in the 2014 valuation was used.

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

System staff has been working on several data clean-up projects. We understand that the reported service and reported 2014 frozen AFC amounts for this year's valuation include the results of this data clean-up, to date. As a result, we saw liability losses related to the improved data that partially offset the gains from investment returns.

Actuarial Assumptions

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

Comments (Concluded)

Restoration

This valuation assumes no future restoration of Component II benefits (consistent with the expectation of the POA). Any future restoration will be reflected beginning in the next valuation after being granted.

DWSD (Water/Sewer) Projections

Based on this valuation, the DWSD (Water/Sewer) division is not expected to be fully funded by 2024. As a result, their contributions will continue to be needed in FY 2024 (see page 2 for estimated FY 2024 contributions) to fund DWSD liabilities.

Future Results

While FY 2018 investment performance has not yet been provided to us, the S&P 500 and the DOW have so far both returned more than 6.75%. If the Retirement System's experience is similar, this will result in upward pressure on the funded status and downward pressure on the FY 2024 contribution requirements (below what is shown in this report), all other assumptions being met.

The POA mandated contributions for FY 2018 and beyond are expected to defund the Retirement System, when all assumptions are realized. In FY 2018, the POA mandated contributions are less than the interest on the projected UAAL. This defunding was contemplated in the POA.

Recommendation

We recommend that every potential action be taken to generate contributions to the Retirement System above those provided in the POA. Benefit payments to retirees in the Plan were almost $250 million compared to FY 2018 contribution of $68.3 million. See benefit projections on page 21.

Prior Recommendation

We understand the Retirement System is working on a project to compute the frozen accrued benefits for active and deferred members. We are currently working with staff to determine if the data audit projects they have completed are sufficient for purposes of the prior recommendation.

Prior Recommendation

The Board is currently working on the development of a funding policy for FY 2024 and beyond.

Conclusion

The funded status of the plan improved this year from 63.8% to 65.6% as a result of investment performance.

Liability by Division - POA

($Thousands)

	General	D.O.T.	DWSD	Library	Totals
Accrued Pension Liabilities					
Retirees and beneficiaries	$1,195,160	$299,986	$628,243	$ 58,946	$2,182,335
Inactive members future deferred pensions	145,325	35,377	83,116	5,569	269,387
Active members	168,041	84,111	35,335	24,180	311,667
Total accrued pension liabilities	1,508,526	419,474	746,694	88,695	2,763,389
Pension fund balances	1,059,149	192,427	512,499	75,301	1,839,376
Unfunded accrued pension liabilities	449,377	227,047	234,195	13,394	924,013
Accrued Annuity Liabilities					
Retirees and beneficiaries#	62,274	10,185	35,280	3,744	111,483
Members annuities & future refunds	60,816	34,543	17,079	8,484	120,922
Total accrued annuity liabilities	123,090	44,728	52,359	12,228	232,405
Annuity fund balances	63,520	36,181	19,610	8,043	127,354
Unfunded accrued annuity liabilities#	59,570	8,547	32,749	4,185	105,051
Totals					
Actuarial Accrued Liabilities	1,631,616	464,202	799,053	100,923	2,995,794
Accrued Assets	1,122,669	228,608	532,109	83,344	1,966,730
Funded Ratio	68.8%	49.2%	66.6%	82.6%	65.6%
Unfunded Actuarial Accrued Liabilities	**$ 508,947**	**$235,594**	**$266,944**	**$ 17,579**	**$1,029,064**

Totals may be off slightly due to rounding.

Liabilities are shown gross, before the annuity savings claw-back. The pension fund balance includes a receivable of approximately $105.6 million for future claw-back payments.

SECTION B

FUND ASSETS

Statement of Plan Assets
(Reported Assets at Market Value)

Market Value - June 30, 2017	
Cash and cash equivalents	$ 105,393,594
Global equities	993,355,081
Global fixed income	96,803,311
Real assets	315,072,600
Private equities	81,149,584
Diversifying strategies	266,163,808
Accrued investment income	1,657,147
Contributions	4,250,318
Receivables from investment sales	6,884,559
Other receivable	135,354
ASF recoupment receivable	105,619,901
Notes receivable from participants	4,846,803
Asset-backed securities	13,264,422
Time deposit	2,729,819
Repurchase agreements	19,699,114
Corporate floating rate	38,815,711
Capital assets	267,889
Accrued expenses	(4,844,383)
Payables for Investment purchases	(7,817,063)
Due to the City of Detroit	(1,190,533)
Amounts due broker under securities lending arrangements	(73,670,689)
Other liabilities	(1,857,372)
Total Current Assets	**$ 1,966,728,975**

Market Value of Assets

Reserve Accounts
(Market Value)

Funds	Fund Balances June 30, 2017	Fund Balances June 30, 2016
Annuity Savings	$ 120,921,554	$ 146,377,716
Annuity Reserve	6,431,736	12,040,933
Pension Accumulation	(122,691,271)	(158,885,695)
Pension Reserve	1,962,066,956	1,934,008,353
Total Fund Balances	**$ 1,966,728,975**	**$1,933,541,307**

Revenues and Expenditures
(Market Value)

	Pension Funds	Annuity Funds	Total Funds
Balance, July 1, 2016	$1,775,122,659	$158,418,648	$1,933,541,307
Prior valuation audit adjustment	0	0	0
Market Value July 1, 2016	$1,775,122,659	$158,418,648	$1,933,541,307
Revenues			
Member Contributions	0	0	0
Employer Contributions	68,249,000	0	68,249,000
DIA Contributions	375,000	0	375,000
State of Michigan Contributions	0	0	0
UTGO Contributions	22,614,402	0	22,614,402
ASF Recoupment Interest	7,374,918	0	7,374,918
Investment Income (Net)	203,352,603	3,543,964	206,896,567
Other	547,983	401,174	949,157
Transfers	0	0	0
Total	$ 302,513,906	$ 3,945,138	$ 306,459,044
Expenditures			
Benefit Payments	232,239,043	10,698,963	242,938,006
Refund of Member Contributions	0	21,413,027	21,413,027
Other	0	2,898,506	2,898,506
Expenses	6,021,837	0	6,021,837
Total	$ 238,260,880	$ 35,010,496	$ 273,271,376
Market Value June 30, 2017	$1,839,375,685	$127,353,290	$1,966,728,975
Market Value Rate of Return (Net of all expenses)	12.4%	0.7%	11.5%

Rates of return are dollar weighted estimates assuming contributions occur at the end of the year and remaining items are mid-year cash flows. “ASF Recoupment Interest” and “Other” items are treated as investment cash flows.

Note that interest credits to the ASF (and other reserves) are determined by plan provisions and Board policy (including any timing issues) as calculated by Retirement System staff.

Allocation of Assets Used for Valuation by Reserve Account and Division

	June 30, 2016	Adjustment	Contributions	Benefit Payments	Other	Investment Return (net of all expenses)	June 30, 2017
Annuity Savings Fund							
General	$ 75,400,247	$ (3,670,089)	$ 0	$ (11,542,509)	$ (1,195,187)	$ 1,823,648	$ 60,816,110
D.O.T.	38,507,842	(225,709)	0	(4,263,837)	(440,009)	964,502	34,542,789
DWSD	23,987,557	(1,153,544)	0	(5,430,343)	(855,327)	530,207	17,078,550
Library	8,482,070	(40,425)	0	(176,338)	(6,809)	225,607	8,484,105
Totals	146,377,716	(5,089,767)	0	(21,413,027)	(2,497,332)	3,543,964	120,921,554
Annuity Reserve Fund							
General	5,020,125	3,670,088	0	(5,986,803)	0	0	2,703,410
D.O.T.	2,307,394	225,709	0	(894,775)	0	0	1,638,328
DWSD	4,698,690	1,153,544	0	(3,320,781)	0	0	2,531,453
Library	14,724	40,425	0	(496,604)	0	0	(441,455)
Totals	12,040,933	5,089,766	0	(10,698,963)	0	0	6,431,736
Pension Accumulation Fund							
General	(65,094,589)	(112,046,104)	45,388,561	0	4,361,467	112,562,761	(14,827,904)
D.O.T.	(67,102,310)	(26,253,216)	100,841	0	1,333,370	22,256,122	(69,665,193)
DWSD	(44,999,470)	(115,396,883)	42,900,000	0	2,060,653	54,679,245	(60,756,455)
Library	18,310,674	(6,601,442)	2,849,000	0	167,412	7,832,637	22,558,281
Totals	(158,885,695)	(260,297,645)	91,238,402	0	7,922,902	197,330,765	(122,691,271)
Pension Reserve Fund							
General	1,093,490,894	112,046,106	0	(131,560,537)	0	0	1,073,976,463
D.O.T.	266,980,784	26,253,214	0	(31,141,533)	0	0	262,092,465
DWSD	520,849,117	115,396,882	0	(62,990,946)	0	0	573,255,053
Library	52,687,558	6,601,444	0	(6,546,027)	0	0	52,742,975
Totals	1,934,008,353	260,297,646	0	(232,239,043)	0	0	1,962,066,956
Retirement System Totals	$1,933,541,307	$ 0	$91,238,402	$ (264,351,033)	$ 5,425,570	$ 200,874,729	$1,966,728,975

SECTION C

PARTICIPANT DATA

Reconciliation of Raw Data

Active Members

A)	Count reported in GC_Benefits table	3,438
B)	Not in GC_Benefits but in Hybrid file and PF_Benefits	45
C)	In prior year Legacy active data and Hybrid data but not in current GC_Benefits	44
D)	In GC_Benefits file but not in Hybrid file	(69)
E)	Hired after valuation date	(197)
F)	No hire date in Hybrid file	(2)
G)	Zero salary in Hybrid file	(9)
H)	Non-active Status	(80)
I)	Non-eligible class code & bargaining unit	(20)
J)	Agency "88"	(24)
K)	Rehire estimated termination prior to 2011	(101)
L)	Number of records to value	3,025

Inactive Vested Members

A)	Number of records reported on data file	3,326
B)	In Legacy active file but not otherwise in database and not in Hybrid active file	72
C)	Valued as inactive in prior year and would not have otherwise been valued this year	374
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 this year	132
E)	Non-eligible bargaining unit	(46)
F)	In General file with Police and Fire Revenue Group	(49)
G)	In Police and Fire file with General Revenue Group	18
H)	Valued as Legacy Retiree	(327)
I)	Other Changes	(4)
J)	Duplicate Records	-
K)	Less than 8 years of service	(177)
L)	Valued as inactive in prior year and in this year's Hybrid active data but not valued as Legacy active and would not have otherwise been valued in Legacy this year	20
M)	Valued as a vested active member in prior year and in this year's Hybrid active data but valued as Legacy active and would not have otherwise been valued in Legacy this year	16
N)	Number of records to value	3,355

Retired Members and Beneficiaries

A)	Number of records reported on data file:	42,360
B)	Number of records in Police and Fire plan:	(15,724)
C)	Records not currently in receipt of benefits:	(14,602)
D)	Component I (Hybrid) Records:	(200)
E)	Number of records valued:	11,834

Data Approximations and Assumptions

Active

For active members, frozen AFC amounts and frozen service as of June 30, 2014 was reported. For purposes of this valuation, we matched the June 30, 2017 actives to the active data reported for the June 30, 2014 valuation to check against AFC as of June 30, 2014. In cases where the frozen AFC as reported in the 2017 data file was less than 75% of the AFC as reported on the 2014 data file, the AFC as reported on the 2014 data file was used.

Deferred

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

- Age 55 if 30 or more years of service and hired before July 1986;
- Age 60 if less than 30 years of service, but more than 10 years of service and hired before 1986; and
- Age 62 for all others.

Entire amount of deferred benefits was assumed to commence at the same time regarding the date of hire.

Retired and Beneficiary

It is our understanding that the current pension amount provided in the retiree data includes the 4.5% reduction as mandated in the POA. However, for members that retired prior to July 2015, the other pension amounts provided in the data (original pension amount, equated pension amount, and prior year's pension amount) did not reflect the 4.5% reduction and, as such, were reduced by 4.5% when valuing any related liability. Other adjustment assumptions include:

- In cases where the benefit is identified to be a joint and survivor benefit and a beneficiary is not listed in the data, it was assumed that male spouses were 3 years older than females;
- For non-equated members that elected a pop-up benefit, the pop-up amount is estimated based on the chosen option and benefit amounts provided in the data;
- Benefits for dependent children are assumed to cease at age 21; and
- For non-converted disabled members, converted benefits are:
    - assumed to commence at age 60; and
    - estimated, based on reported service and projected service from the date of disability to age 60.

Please see our correspondence dated April 3, 2017 for additional information regarding data reconciliation, processing instructions, and assumptions regarding unresolved issues. Note, this letter disclosed our data procedures and assumptions and we received confirmation from staff.

Summary of Member Data
June 30, 2017

Active Members

	General	D.O.T.	DWSD*	Library	Totals^
Number	1,800	616	362	247	3,025
% Change in active members	0.7 %	(8.6)%	(27.9)%	(9.2)%	(6.5)%
Annual payroll ($ millions)	$ 89.4	$ 23.9	$ 17.3	$ 10.9	$ 141.5
Average pay	$49,654	$38,826	$47,805	$43,950	$46,762
% Change in average pay	5.8 %	2.7 %	5.0 %	2.6 %	5.2 %

^ *May not add due to rounding.*

* *Includes 7 members that were listed with a General revenue group in the 2017 active data file. These 7 members also appeared in a separate file that listed DWSD members as of June 30, 2014.*

Retired Members and Survivor Beneficiaries

	General	D.O.T.	DWSD	Library	Totals
Number	7,069	1,638	2,799	328	11,834
Annual benefits ($ millions) #	$ 134.1	$ 31.4	$ 65.3	$ 7.1	$ 238.0
Average benefits #	$18,976	$19,183	$23,335	$21,695	$20,111
% Change in reported average benefit	0.4 %	1.3 %	(0.3)%	(0.3)%	0.3 %

Includes annuities. Does not include reductions resulting from the annuity claw-backs.

Inactive Vested Members

	General	D.O.T.	DWSD	Library	Totals
Number	1,864	413	991	87	3,355
Average FAC	40,201	42,761	48,373	31,780	42,711
Average service	15.9	15.9	15.8	15.5	15.9
Annual benefits ($ millions)	$ 19.6	$ 4.6	$ 12.4	$ 0.7	$ 37.3
Average benefits	$10,496	$11,218	$12,519	$8,252	$11,124
% Change in average service	0.0 %	0.0 %	0.0 %	6.9 %	0.1 %
% Change in average FAC	(2.5)%	1.6 %	(0.1)%	(0.4)%	(1.0)%

Active Members as of June 30, 2017
by Attained Age and Years of Service
Retirement System Totals

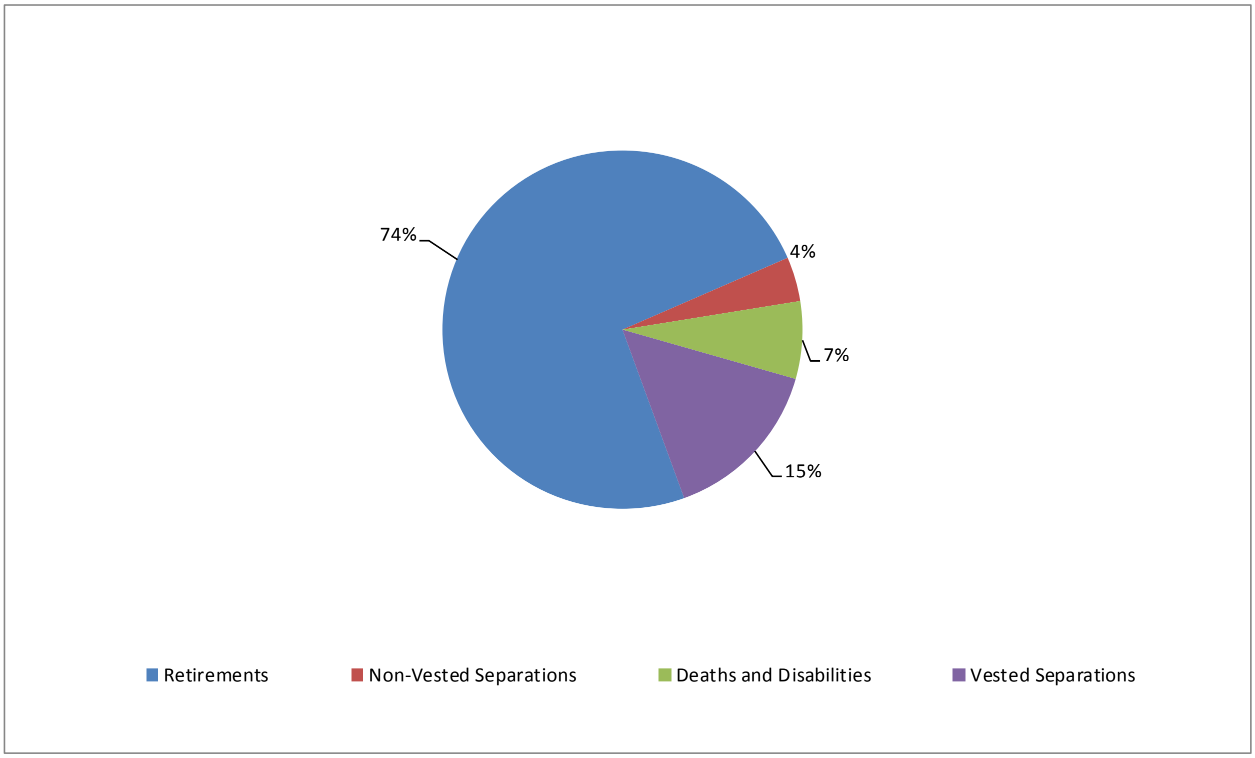
Attained Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
20-24	11	0						11	$ 331,556
25-29	50	12	1					63	2,353,554
30-34	31	44	19	1				95	4,028,703
35-39	33	41	63	54	1			192	7,834,573
40-44	48	62	72	91	50	1		324	14,909,950
45-49	29	50	82	168	133	37	3	502	23,937,051
50-54	25	40	69	170	182	113	48	647	31,164,687
55-59	42	39	62	139	132	137	114	665	31,764,471
60-64	16	41	40	75	77	65	76	390	18,469,796
65-69	8	12	18	14	10	14	13	89	4,501,307
70-74	3	3	4	9	4	4	7	34	1,571,163
75-79	0	1	4	2	1	2	3	13	587,906
Totals	**296**	**345**	**434**	**723**	**590**	**373**	**264**	**3,025**	**$141,454,717**

Group Averages:

Age:	51.1 years
Service:	17.8 years
Annual Pay:	$46,762

Service shown in this schedule is Legacy benefit service plus Hybrid Benefit service. Hybrid service provided on the data file was reduced by two months to account for additional service granted past the valuation date.

Expected Terminations from Active Employment for Current Active Members



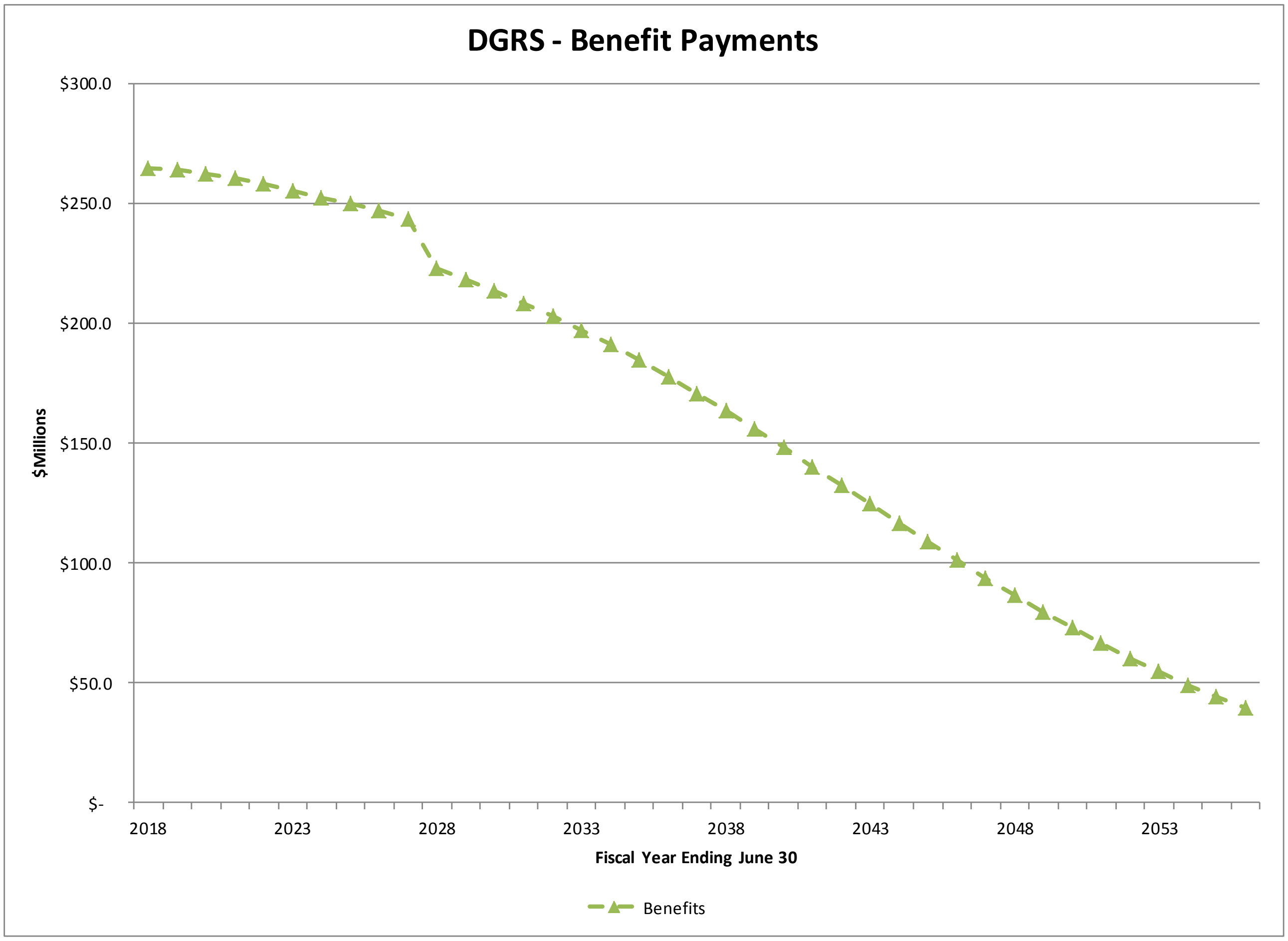
The chart shows the expected future development of the present population in simplified terms. The Retirement System presently covers 3,025 active members. Eventually, 131 people are expected to terminate covered employment prior to retirement and forfeit eligibility for an employer provided benefit. 2,674 people are expected to receive monthly retirement benefits either by retiring directly from active service, or by retiring from vested deferred status. 220 people are expected to become eligible for benefits as a result of death-in-service or disability.

Actual versus expected retirements for the 2017 fiscal year is shown below:

Year Ended June 30,	Expected	Actual
2017	210	107

Expected Benefit Payments

Shown below is a graph of projected benefit payments remaining in the Retirement System.



This chart illustrates the continued cash flow needs anticipated in the next 5-10 years as most of the individuals in the plan move to payment status.

Retirees and Beneficiaries June 30, 2017
Tabulated by Attained Ages
Retirement System Totals

Attained Ages	Age & Service# No.	Age & Service# Monthly Allowances	Disability No.	Disability Monthly Allowances	Death-in-Service No.	Death-in-Service Monthly Allowances	Totals No.	Totals Monthly Allowances
Under 20*	10	$ 13,204	0	$ 0	4	$ 2,403	14	$ 15,607
20-24	2	4,628					2	4,628
25-29	9	7,636					9	7,636
30-34	7	3,066	0	0			7	3,066
35-39	9	5,868	3	1,650			12	7,518
40-44	18	12,854	13	7,540	2	1,387	33	21,781
45-49	70	87,362	32	18,732	4	4,237	106	110,331
50-54	291	505,689	82	57,330	13	15,847	386	578,866
55-59	792	1,652,940	177	151,949	33	37,840	1,002	1,842,729
60-64	1,693	3,334,973	259	348,778	36	42,234	1,988	3,725,985
65-69	2,199	3,999,446	185	219,450	44	72,266	2,428	4,291,162
70-74	1,781	3,211,802	131	137,807	36	55,083	1,948	3,404,692
75-79	1,180	1,755,850	70	62,747	36	40,514	1,286	1,859,111
80-84	862	1,183,770	44	37,797	32	37,140	938	1,258,707
85-89	759	919,650	26	18,615	41	30,434	826	968,699
90-94	570	610,952	29	21,271	40	33,838	639	666,061
95 and Over	189	167,319	3	1,977	18	12,815	210	182,111
Totals	**10,441**	**$17,477,009**	**1,054**	**$1,085,643**	**339**	**$386,038**	**11,834**	**$18,948,690**

** May include records with defective birth dates.*
 # Includes survivor beneficiaries of deceased retirees.

Retirees and Beneficiaries June 30, 2017
Tabulated by Year of Retirement

Year of Retirement	No.	Monthly Allowances Total	Monthly Allowances Average
1950 & before	4	$ 7,141	$1,785
1951-1955	2	4,158	2,079
1956-1960	3	1,272	424
1961-1965	8	3,457	432
1966-1970	30	13,584	453
1971-1975	112	66,342	592
1976-1980	317	226,749	715
1981-1985	637	646,114	1,014
1986-1990	771	846,607	1,098
1991-1995	1,294	1,628,225	1,258
1996-2000	1,524	2,287,447	1,501
2001-2005	1,973	3,734,166	1,893
2006-2010	2,140	4,053,777	1,894
2011	590	1,200,001	2,034
2012	784	1,475,655	1,882
2013	453	734,004	1,620
2014	402	657,288	1,635
2015	274	419,379	1,531
2016	400	750,718	1,877
2017	116	192,606	1,660
Totals	**11,834**	**$18,948,690**	**$1,601**

SECTION D

METHODS AND ASSUMPTIONS

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

All assumptions are estimates of future experience except as noted. The rationale for the assumptions is based on experience studies where noted.

Economic Assumptions

The investment return rate used in making the valuation 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).

Price inflation is not directly used in the valuation. For purposes of assessing the reasonability of the investment return assumptions, we assumed 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 for 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 with corresponding set forward. 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). 75% of all deaths-in-service are assumed to be non-duty related. This table was first used as of June 30, 2014. For disabled members, the same tables are used. The rationale for the mortality assumption is based on the 2008-2013 Mortality Experience Study issued February 4, 2015.

The probabilities of retirement for members eligible to retire are shown on pages 27 and 28. These probabilities were revised for the June 30, 2008 valuation. The rationale is based on the 2002-2007 Experience Study.

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

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

Funding Methods

The unit credit cost method was used in determining age & service pension liabilities, vesting liabilities, and casualty pension liabilities. Under this method, there is no normal cost since benefits are frozen and there are no future accruals and actuarial accrued liability is the present value of each individual's accrued benefit.

Unfunded Actuarial Accrued Liabilities. Actual employer contributions through June 30, 2023 are set by the POA. The amortization period and method after 2023 has not yet been established by the Board.

Employer contribution dollars were assumed to be paid at the end of the employer fiscal year.

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.

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 2017	Future Life Expectancy (years)	
	Men	Women
45	38.51	41.86
50	33.56	36.81
55	28.80	31.91
60	24.26	27.17
65	19.97	22.60
70	15.99	18.30
75	12.37	14.34
80	9.19	10.84

Probabilities of Age/Service Retirement for Members Eligible to Retire

Retirement Ages	Percent of Eligible Active Members Retiring Within Next Year with Unreduced Benefits		
	EMS	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

Rationale for assumption is 2002 to 2007 Experience Study. Additional retirement rates for Component I (Hybrid Plan) eligibility are not reflected in this valuation due to materiality.

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%
63	12%
64	12%
Ref	1649

Rationale for assumption is 2002 to 2007 Experience Study.

Sample Rates of Separation from Active Employment Before Retirement

Sample Ages	Years of Service	% of Active Members Separating Within Next Year			
		Withdrawal			
				Others	
		EMS	D.O.T.	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

Rationale for assumption is 2002 to 2007 Experience Study.

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 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.
Incidence of Contributions	Contributions are assumed to be received at the end of the year.
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. Straight life is generally the most valuable under valuation assumptions. Actuarial equivalent factors are based on 7.5% interest and 1984 Group Annuity Mortality table.
Service Credit Accruals	Service accruals stop as of June 30, 2014 for measurement of Component II liabilities. However, future service in Component I may be used to satisfy benefit eligibility requirement in Component II. Members who became duty disabled prior to June 30, 2014 are assumed to get projected service from date of disability to conversion date. Member who become disabled after June 30, 2014 are assumed to get their frozen accrued benefit as of June 30, 2014 at date of conversion.
Administrative Expenses	The investment return assumption is mandated to be net of investment and administrative expense in the plan document. No other provision for administrative expenses is included in this valuation.
Sick Leave	Sick leave banks as of June 30, 2014 were included in the 2014 data file provided by the System.
Member Contributions	Member contributions to this Component II plan are assumed to have ceased with the bankruptcy.

Rationale for assumption is 2002 to 2007 Experience Study, modified as necessary for changes in data or administration.

SECTION E

PLAN PROVISIONS

Summary of Benefit Provisions Evaluated

Component II Frozen Benefits

All Component II benefits are frozen as of June 30, 2014 based on service and average final compensation accrued as of that date and the provisions of the Detroit General Retirement System as it existed on June 30, 2014. Frozen benefits are further reduced by 4.5% and all future cost-of-living adjustments ("COLA's") were eliminated. Benefits resulting from the Annuity Savings Fund and benefits paid from the Annuity Reserve Fund were subject to a separate reduction described as a "Claw-back." Details of the claw-back provision are complicated and can be found in the Eighth Amended Plan of Adjustment. The benefits evaluated in this report are the frozen reduced benefits after adjusting the assets for the claw-back. Component II benefits are payable after separation from service, upon meeting the eligibility conditions of the plan as it existed on June 30, 2014, regardless of whether the individual is eligible to receive a Component I benefit at that time.

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

Age and Service Pension

Eligibility - Any age (minimum age 55 for non-EMS members hired after 1995) with 30 years of service (25 for EMS members), or age 60 with 10 years of service, or age 65 with 8 years of service.

Annual Amount - **EMS Members:** Sum of a) a basic pension of $12 for each of the first 10 years of service, plus b) a pension equal to 2.0% of AFC multiplied by years of service. Maximum benefit is 90% of AFC.

Other Members: Sum of a) a basic pension of $12 for each of the first 10 years of service, plus b) a pension equal to the first 10 years of service multiplied by 1.6% of AFC, plus 1.8% of AFC for each year of service greater than 10 years up to 20 years, plus 2.0% of AFC for each year of service greater than 20 years up to 25 years, plus 2.2% of AFC for each year of service greater than 25 years. Future benefit accruals for certain active members (depending on bargaining unit) were reduced to 1.5% of final average compensation per year of service.

Type of Average Final Compensation (AFC) - Highest 3 consecutive years out of the last 10. Pension benefits will not be diminished if compensation is reduced because of a fiscal emergency. Effective July 1, 1999, in computing the AFC, a member shall have the option of adding the value of 25% of unused accrued sick leave to the earnings used in computing the AFC. Longevity is added to AFC in accordance with the following schedule: $150 after 5 years, $300 after 10 years, $450 after 15 years, $600 after 20 years, and $750 after 25 years.

Early Retirement

Eligibility - Any age with 25 or more years of service (min. age 55 for members hired after 1995).

Annual Amount - Same as regular retirement but actuarially reduced.

Summary of Benefit Provisions Evaluated (Continued)

Deferred Retirement (Vested Benefit)

Eligibility - Hired prior to 7-1-80: Age 40 with 8 years of service. Hired on or after 7-1-80: Any age with 10 years of service.

Benefit Commencement - APTE hired prior to July 1, 1988: Benefit begins at the age the member would have become eligible for regular retirement if service had continued. ***SAAA, Non-Union and lawyers hired prior to June 30, 1986:*** Benefit begins at the age the member would have become eligible for regular retirement. ***Others:*** Benefits based on service rendered by June 30, 1986 begin at the age the member would have become eligible for regular retirement. Benefits based on service rendered after July 1, 1986 begin at age 62.

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

Duty Disability Retirement

Eligibility - Service related disability before eligibility for service retirement prior to and July 1, 2014. No service requirement.

Annual Amount - An annuity which is the actuarial equivalent of the accumulated contributions at date of disability plus a pension of two-thirds of average final compensation at time of disability. The maximum annual pension is $5,700 ($9,000 for EMS). At the earliest of when the member would have accrued 30 years of service credit (25 for EMS) or age 60, the annuity is recomputed assuming contributions would have continued at a salary level equal to final compensation. The pension is recomputed with additional service credit granted from the date of disability to age 60 (or 30 years of service credit) or June 30, 2014, whichever is earlier.

Non-Duty Disability Retirement

Eligibility - Disability from any cause before age 60 with 10 or more years of service prior to July 1, 2014.

Annual Amount - Computed in the same manner as a regular retirement benefit. Maximum annual pension to age 60 is $6,000. Benefit is recomputed at age 60 with no maximum.

Duty Death Before Retirement

Eligibility - Death from service related causes. No age or service requirements.

Annual Amount - One-third of final compensation as of June 30, 2014 to the surviving spouse for life or until remarriage, plus an equal share of 1/4 of final compensation to each unmarried child under age 18. If there is no eligible spouse, eligible children each receive 1/4 of final compensation; if there are more than 2 such children, each child shares an equal part of 1/2 of final compensation. Maximum total amount for spouse and children is $9,000 annually. If there is no eligible spouse or children, dependent parents each receive 1/6 of deceased's final compensation, to a total maximum of $600 annually.

Summary of Benefit Provisions Evaluated (Concluded)

Non-Duty Death Before Retirement

Eligibility - Death-in-service at any age with 15 years of service; or after age 60 with 10 years of service; or after age 65 with 8 years of service.

Annual Amount - To Surviving Spouse: Computed as a regular retirement benefit but reduced in accordance with a 100% joint and survivor election for members with 20 or more years of service. For members with 15 years of service but less than 20, benefit is reduced in accordance with a 50% joint and survivor election. To Dependent Children if no Surviving Spouse: $9,000 payable to age 19 of the youngest child or for life if child is physically or mentally impaired for members with 20 or more years of service ($6,000 if less than 20 years of service).

Post-Retirement Cost-of-Living Adjustments

Benefit is increased annually by 2.25% of the **original** pension amount at retirement. Post-retirement cost-of-living increases were eliminated on future accruals for certain active members (depending on bargaining unit).

Member Contributions

Members have the option of choosing one of four contribution amounts: (1) 0%; (2) 3.0% of compensation up to the Social Security wage base, plus 5.0% of compensation in excess of the Social Security wage base; (3) 5.0% of total compensation; or (4) 7.0% of total compensation. Member contributions can be paid as a lump sum or annuitized at retirement to provide an annuity in addition to the pension (which is not affected by the level of member contributions).

SECTION F

GLOSSARY

Glossary

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

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

Actuarial Assumptions. Estimates of future plan experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

Actuarial Cost Method. A mathematical budgeting procedure for allocating the dollar amount of the "actuarial present value of future plan benefits" between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the "actuarial funding method."

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

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

AFC. Average Final Compensation.

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

APTE. Association of Professional and Technical Employees.

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

DIA. Detroit Institute of Art.

D.O.T. Department of Transportation.

DWSD. Detroit Water and Sewerage Department.

EMS. Emergency Medical Service.

Glossary

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

GASB. The Governmental Accounting Standards Board.

GLWA. Great Lakes Water Authority.

Normal Cost. The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as "current service cost." Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.

POA. The 8^{th} Amended Plan for the Adjustment of the Debt of the City of Detroit.

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

SAAA. Senior Accountants, Analysts, and Appraisers Association.

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

Unfunded Actuarial Accrued Liability. The difference between the actuarial accrued liability and valuation assets. Sometimes referred to as "unfunded accrued liability."

UTGO. Unlimited Tax General Obligation.

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