



# Macomb County Employees Retirement System

## Actuarial Valuation Report

Plan Year            January 1, 2018 – December 31, 2018

August 2019



August 2019

The Retirement Commission  
Macomb County Employees Retirement System  
Mount Clemens, Michigan

Ladies and Gentlemen:

Macomb County retained Buck to complete this actuarial valuation of the Macomb County Employees Retirement System. This report summarizes the actuarial valuation results of Macomb County Employees Retirement System as of December 31, 2018.

### **Purpose of This Report**

Buck has prepared this report for Macomb County for use in review of the operation of the plan, including determining contributions to be made to the plan, and as a source of information for the financial statements of the plan. An actuarial valuation is performed on the retirement plan annually as of the beginning of the fiscal year. The main purposes of the actuarial valuation detailed in this report are:

1. To determine if the funding policy for the Retirement Plan is being met considering current assets and the current employer and member contribution rates; or determine the employer contribution necessary to meet the Commission's funding policy for the Plan;
2. To disclose the funding assets and liability measures as of the valuation date;
3. To review the current funded status of the Plan;
4. To compare actual and expected experience under the Plan during the last fiscal year;
5. And to report trends in contributions, assets, liabilities, and funded status over the last several years.

This actuarial valuation provides a "snapshot" of the funded position of the Retirement Plan based on the plan provisions, membership, assets, and actuarial assumptions as of the valuation date.

Use of this report for any other purpose may not be appropriate and may result in mistaken conclusions due to failure to understand applicable assumptions, methodologies, or inapplicability of the report for that purpose. Because of the risk of misinterpretation of actuarial results, Buck recommends requesting its advance review of any statement, document, or filing to be based on information contained in this report. Buck will accept no liability for any such statement, document or filing made without its prior review.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law. Because of limited scope, Buck performed no analysis of the potential range of such future differences.

### **Data Used**

The actuarial valuation is based on unaudited financial and member data provided by the staff of the Retirement System and summarized in this report. The benefits considered are those delineated in the plan as amended and restated effective December 31, 2015. The actuary did not verify the data submitted but did perform tests for consistency and reasonableness.

### **Assumptions and Methods**

All costs, liabilities and other factors under the Plan were determined in accordance with actuarial principles and procedures adopted in accordance with the Actuarial Standards of Practice (ASOPs). An actuarial cost method is used to measure the actuarial liabilities which we believe is reasonable. Buck is solely responsible for the actuarial data and actuarial results presented in this report. This report fully and fairly discloses the actuarial position of the Plan.

In our opinion, the actuarial assumptions used are reasonable, taking into account the experience of the Plan and reasonable long-term expectations, and represent our best estimate of the anticipated long-term experience under the Plan. The actuary performs an analysis of Plan experience periodically and recommends changes if, in the opinion of the actuary, assumption changes are needed to more accurately reflect expected future experience.

Where presented, references to “funded ratio” and “unfunded accrued liability” typically are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded accrued liabilities. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the plan if the plan were to settle (i.e. purchase annuities) for a portion or all of its liabilities.

### **Actuarial Certification**

The undersigned is a Fellow of the Society of Actuaries and a Member of the American Academy of Actuaries and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained in this report. This report has been prepared in accordance with all Applicable Actuarial Standards of Practice and he is available to answer any questions on the material contained in the report, or to provide explanations or further details as may be appropriate.

Respectfully submitted,

Buck Global, LLC (Buck)



Troy Jaros, FSA, EA, MAAA, FCA  
Director, Retirement Actuary

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# Summary of Results

## Overview

The Macomb County Employees Retirement System provides pension and ancillary benefit payments to the terminated and retired employees of Macomb County, Michigan. A Retirement Commission comprised of employer, employee, and appointed representatives is responsible for administering the Plan and making investment decisions. This report presents the results of the actuarial valuation of the Employees Retirement System as of December 31, 2018.

## Membership

### Actives

As of December 31, 2018, there were 1,751 employees in active service covered under the provisions of the Plan not participating in DROP. The significant age, service, and salary information for these employees is summarized below, along with comparative figures from the last actuarial valuation one year earlier.

	December 31, 2018	December 31, 2017
Active participants		
Number	1,751	1,842
Average age	46.6 years	45.7 years
Average service	11.6 years	10.9 years
Total annual valuation salary	\$ 107,524,311	\$ 112,878,234
Average annual salary	\$ 61,407	\$ 61,280

The number of active members decreased by 4.9% from the previous valuation date as the plan is closed to the entrance of new members. The average age of the active members increased by 0.9 years and the average service increased 0.7 years. The total annual valuation salary decreased by 4.7% and the average salary increased by 0.2% from the previous valuation. There were 1,681 active members who were also reported active in the December 31, 2017 actuarial valuation. The total salary for this group increased by 1.62% which was lower than the 5.0% increase we expected for the group.

Distributions of active members by age, service, and salary are given in Section 3.2. The salaries shown for active members are the actual annualized salaries reported.

A schedule of active member data and reconciliation of the active membership from the previous year is shown in Sections 3.3 and 3.4.

In addition, there are 1,138 active employees (not included above) hired after December 31, 2015 earning vesting service to receive a \$1,000 lump sum benefit upon termination of employment.

### Inactives

In addition to the active members, there were 670 inactive members who did not elect to receive their accumulated contributions when they left covered employment. The significant age and annual benefit information for these inactive members are summarized below with comparative figures from the last actuarial valuation one year earlier.

	December 31, 2018	December 31, 2017
Terminated vested participants		
Number	314	293
Average age	51.1 years	50.3 years
Average annual benefit payments	\$ 12,641	\$ 11,977

The number of inactive vested members increased by 7.2% from the previous valuation. The average age of the inactive vested members increased by 0.8 years. The Average Annual Pension Benefit for these members increased by 5.5% from the previous valuation.

	December 31, 2018	December 31, 2017
Non-vested participants owed refund		
Number	356	375
Average payoff amount	\$ 2,018	\$ 1,929

The number of inactive non-vested members decreased by 5.1% from the previous valuation. The Average Refund Due for these members increased by 4.6% from the previous valuation.

Distributions of inactive members by age and pension benefit are given in Section 3.6.

### Retirees and Beneficiaries

In addition to the active and inactive members, there were 2,313 retired members and 379 beneficiaries who are receiving monthly benefit payments on the valuation date. The significant age and annual benefit information for these members are summarized below with comparative figures from the last actuarial valuation performed one year earlier.

	December 31, 2018	December 31, 2017
Retired participants		
Number	2,313	2,269
Average Age	69.3 years	69.1 years
Average annual retirement benefits	\$ 21,917	\$ 21,687

	December 31, 2018	December 31, 2017
Survivors and beneficiaries of participants		
Number	379	364
Average Age	72.7 years	72.6 years
Average annual retirement benefits	\$ 14,794	\$ 14,108

The number of retired members and beneficiaries increased by 2.2% from the previous valuation date. The average age of the retired members and beneficiaries increased by 0.2 years. The average annual benefit payments for these members increased by 1.3% from the previous valuation date.

Distributions of retired members by age and form of payment are given in Section 3.6 and 3.7.

### DROP Participants

In addition to the actives, inactives, and retirees, there were 281 DROP members who are receiving monthly benefit payments on the valuation date. The significant age and annual benefit information for these members are summarized below.

	December 31, 2018	December 31, 2017
DROP participants		
Number	281	319
Average Age	58.4 years	58.2 years
Average annual retirement benefits	\$ 28,855	\$ 28,315
Average pay	\$ 59,443	\$ 58,711

In our opinion, the membership data collected and prepared for use in this actuarial valuation meets the data quality standards required under Actuarial Standards of Practice No. 23.

## Plan Assets

The Plan's assets are held in trust and invested for the exclusive benefit of plan members. The trust is funded by member and employer contributions and pays benefits directly to eligible members in accordance with plan provisions. The assets are audited annually and are reported at fair value. On a fair value basis, the Plan has Net Assets Available for Benefits of \$937.1 million as of December 31, 2018. This includes a decrease of \$100.3 million over the Net Assets Available for Benefits of \$1,037.4 million as of December 31, 2017. During the prior year, the fair value of assets experienced an investment rate of return of (5.88)%.

In order to reduce the volatility investment gains and losses can have on the Plan's actuarially required contribution and funded status, the Commission has adopted a five-year smoothing method to determine the actuarial value of assets used for funding purposes. This method recognizes gains and losses, i.e. the difference between actual investment return during the year and the expected return based on the valuation interest rate, on a level basis over a five-year period. In our opinion, this method complies with Actuarial Standards of Practice No. 44.

As of December 31, 2018, the assets available for benefits on an actuarial value basis was \$999.6 million. This includes an increase of \$8.8 million over the actuarial value of assets of \$990.8 million as of December 31, 2017. During the prior year, the actuarial value of assets experienced an actuarial rate of return of 5.08%.

A summary of the assets held for investment, a summary of changes in assets, and the development of the actuarial value of assets is shown in Section 2.

## Actuarial Experience

Differences between the expected experience based on the actuarial assumptions and the actual experience create changes in the actuarial accrued liability, actuarial value of assets, and the unfunded actuarial accrued liability from one year to the next. These changes create an actuarial gain if the experience is favorable and an actuarial loss if the experience is unfavorable. The Plan experienced a total net actuarial loss of \$14.3 million during the prior year. This total net loss is about 1.4% of the plan's prior year actuarial accrued liability.

The demographic experience tracks actual changes in the plan's population compared to the assumptions for decrements such as mortality, turnover, and retirement, as well as pay increases. The Plan experienced a demographic gain of \$7.5 million during the year ending December 31, 2018. This gain decreased the unfunded actuarial accrued liability by \$7.5 million and increased the funded ratio by 0.7%.

Continued tracking of the demographic experience is warranted in order to confirm the appropriateness of the actuarial assumptions. Details of the demographic, economic, and other assumptions used to value the plan liabilities and normal cost can be found in Section 6. In our opinion, the economic assumptions comply with Actuarial Standards of Practice No. 27 and the demographic assumptions comply with Actuarial Standards of Practice No. 35.

On the asset side, the Plan experienced a loss on an actuarial value of assets basis. The actual rate of return on the actuarial value of plan assets for the year ending December 31, 2018 was approximately 5.08% compared to the assumption of 7.25%, resulting in an asset loss of \$21.8 million. This loss increased the unfunded actuarial accrued liability by \$21.8 million and decreased the funded ratio by 2.1%.

The rate of return on the fair value of assets for the year ending December 31, 2018 was approximately (5.88)%, which was lower than the assumed rate of 7.25%. The actuarial value of the assets recognizes only 1/5 of the 2018 gain on fair value, delaying the recognition of the remaining 4/5 over the next four years. Moreover, the actuarial value of assets also recognizes deferred portions of prior years' gains and losses on fair value. It should be noted that the plan's assumed asset return of 7.25% is a long-term rate and short-term performance is not necessarily indicative of expected long-term future returns.

A summary of the actuarial gains and losses experienced during the prior year is shown in Section 1.3.

## **Actuarial Contributions**

Effective with the December 31, 2013 annual valuation, the Retirement Commission established a closed 20-year amortization policy assuming 5.00% payment increases. For this valuation, the remaining period is 15 years.

The normal cost represents the cost of the benefits that accrue during the year for active members under the Entry Age Normal Actuarial Cost Method. It is determined as a level percentage of pay which, if paid from entry age to the assumed retirement age, assuming all the actuarial assumptions are exactly met by plan experience would accumulate to a fund sufficient to pay all benefits provided by the Plan. The expected member contributions are subtracted from this amount to determine the employer normal cost. The employer normal cost for 2019 has been determined to be \$10.4 million or 9.78% of pay.

The cost method also determines the actuarial accrued liability which represents the value of all accumulated past normal cost payments. This amount is compared to the actuarial value of assets to determine if the Plan is ahead or behind in funding as of the valuation date. The difference between the total actuarial accrued liability and the actuarial value of assets equals the amount of unfunded actuarial accrued liability or surplus (if negative) on the valuation date. This amount is amortized and added to the employer normal cost to determine the annual actuarially required employer contribution for the year.

The unfunded actuarial accrued liability as of December 31, 2018 is \$34.7 million. This represents an increase of \$12.4 million in the unfunded actuarial accrued liability from last year's amount of \$22.3 million.

The annual actuarially required employer contribution for 2020 is \$14.3 million, or 13.35% of pay. This represents a decrease of \$1.8 million in the employer contribution amount of \$16.1 million for 2019, or a decrease of 1.25% of pay from last year's employer contribution rate of 14.60%.

The actuarial liabilities and development of the annual actuarial employer contribution is shown in Sections 1.1 and 1.2.

In our opinion, the measurement of the benefit obligations and determination of the actuarial cost of the Plan is performed in compliance with Actuarial Standards of Practice No. 4.

## **Funded Status**

The funded status is a measure of the progress that has been made in funding the plan as of the valuation date. It is determined as a ratio of the actuarial value of assets divided by the total actuarial accrued liability on the valuation date. A ratio of over 100% represents a plan that is ahead in funding, and a ratio of less than 100% represents a plan that is behind in funding on the valuation date.

As of December 31, 2018, the funded ratio of the Plan is 96.7%. This represents a decrease of 1.1% from last year's funded ratio of 97.8% as of December 31, 2017.

A history of the unfunded actuarial accrued liability and the funded ratio is shown in Section 1.5.

## **Changes in Plan Provisions**

There have been no changes in benefits or other plan provisions considered in this actuarial valuation since the last valuation performed as of December 31, 2017.



## Changes in Actuarial Assumptions, Methods, or Procedures

The actuarial assumptions and methods for funding purposes are the same as those used for the December 31, 2017 report except as follows:

- The interest rate was changed from 7.25% to 7.00%. This change increased the Actuarial Accrued Liability by \$25.4 million.

As a result of the experience study, the following assumptions were changed:

- The mortality tables for active and deferred vested participants were changed to the RP-2014 (Base 2006) Mortality Tables, projected with scale MP-2018 on a fully generational basis.
- The mortality tables for healthy retirees were changed to the RP-2014 (Base 2006) Mortality Tables adjusted by 105% for males and 110% for females, projected with scale MP-2018 on a fully generational basis.
- The mortality tables for disabled retirees were changed to the RP-2014 (Base 2006) Disabled Mortality Tables adjusted by 106% for males and 114% for females, projected with scale MP-2018 on a fully generational basis.
- The number of eligible participants assumed to enter DROP was changed from 100% to 75%. The number of years a DROP participant is assumed to remain in DROP was changed from 5 years to 4 years.
- Salary scale, termination, disability, and retirement rates were all updated based on the results of the experience study.
- The net effect of the assumption changes from the experience study was a decrease in the Actuarial Accrued Liability of \$26.4 million.

# Comparative Summary of Key Actuarial Valuation Results

Actuarial Valuation as of

December 31, 2018

December 31, 2017

## Summary of Member Data

Number of Members Included in the Valuation

Active Members	1,751	1,842
Terminated Vested Members	314	293
Non-vested Members Owed Refund	356	375
Retirees and Beneficiaries	2,692	2,633
DROP Participants	<u>281</u>	<u>319</u>
Total	5,394	5,462

Annual Payroll

Average (actual)	61,407	61,280
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Annual Benefit Payments

Terminated Vested Members (Average)	12,641	11,977
Non-vested Member Refund (Average)	2,018	1,929
Retirees and beneficiaries (Average)	20,916	20,639
DROP Participants (Average)	28,855	28,315

## Summary of Assets

Fair Value	937,087,932	1,037,372,865
Rate of Return	(5.88)%	16.56%
Actuarial Value	999,604,207	990,802,562
Rate of Return	5.08%	10.01%

## Summary of Liabilities

Total Actuarial Accrued Liability	1,034,282,157	1,013,110,113
Actuarial Value of Assets	999,604,207	990,802,562
Unfunded Actuarial Accrued Liability	34,677,950	22,307,551
Funded Ratio	96.65%	97.80%
Maturity Ratio (See section 1.2)	60.31%	58.91%

# Section 1: Actuarial Funding Results

## Section 1.1 - Actuarial Liabilities and Normal Cost

Actuarial Liabilities Based on December 31, 2018 Valuation	General County	Sheriff's Department	Road Commission	Martha T. Berry	Totals
1. Present Value of Projected Benefits					
Active Members					
Retirement Benefits	151,359,006	132,338,765	40,580,337	6,626,885	330,904,993
Withdrawal Benefits	18,929,707	4,691,763	871,430	1,801,423	26,294,323
Disability Benefits	11,577,580	4,811,014	1,437,386	710,391	18,536,371
Death Benefits	3,193,926	1,861,702	535,091	166,280	5,756,999
Return on Contributions	<u>1,826,130</u>	<u>400,892</u>	<u>162,711</u>	<u>237,158</u>	<u>2,626,891</u>
Total	186,886,349	144,104,136	43,586,955	9,542,137	384,119,577
2. Vested Inactive Members with Deferred Benefits	16,959,777	3,905,753	2,484,700	1,508,294	24,858,524
3. Non-Vested Inactive Members with Deferred Benefits	506,237	36,457	11,946	80,995	635,635
4. Retired Members and Beneficiaries Receiving Benefits	348,172,078	149,444,054	75,445,661	25,190,924	598,252,717
5. DROP Participants Receiving Benefits	78,373,464	27,023,719	24,304,841	2,025,938	131,727,962
6. Total Present Value of Projected Benefits (1 + 2 + 3 + 4 + 5)	630,897,905	324,514,119	145,834,103	38,348,288	1,139,594,415
7. Present Value of Future Normal Costs	<u>50,422,753</u>	<u>43,432,317</u>	<u>8,345,700</u>	<u>3,111,488</u>	<u>105,312,258</u>
8. Total Actuarial Accrued Liability (6 – 7)	580,475,152	281,081,802	137,488,403	35,236,800	1,034,282,157

Normal Cost for Fiscal Year Beginning December 31, 2018	General County	Sheriff's Department	Road Commission	Martha T. Berry	Totals
1. Total Normal Cost	7,211,715	5,025,834	1,295,732	456,593	13,989,874
2. Expected Member Contribution	<u>(1,777,065)</u>	<u>(1,282,279)</u>	<u>(347,653)</u>	<u>(140,640)</u>	<u>(3,547,637)</u>
3. Employer Normal Cost	5,434,650	3,743,555	948,079	315,953	10,442,237

## Section 1.2 – Actuarial Contributions

	General County	Sheriff's Department	Road Commission	Martha T. Berry	Totals
1. Total Actuarial Accrued Liability					
a. Active Members					
i. Retirement Benefits	115,304,901	94,678,908	33,434,732	4,645,330	248,063,871
ii. Withdrawal Benefits	11,789,195	2,235,973	507,327	1,220,364	15,752,859
iii. Death Benefits	2,039,629	1,079,075	357,024	102,517	3,578,245
iv. Disability Benefits	6,906,690	2,637,941	912,288	415,379	10,872,298
v. Return on Employee Contributions	423,181	39,922	29,884	47,059	540,046
vi. Total	136,463,596	100,671,819	35,241,255	6,430,649	278,807,319
b. Vested Inactive Members with Deferred Benefits	16,959,777	3,905,753	2,484,700	1,508,294	24,858,524
c. Non-Vested Inactive Members with Deferred Benefits	506,237	36,457	11,946	80,995	635,635
d. Retired Members and Beneficiaries Receiving Benefits	348,172,078	149,444,054	75,445,661	25,190,924	598,252,717
e. DROP Participants Receiving Benefits	78,373,464	27,023,719	24,304,841	2,025,938	131,727,962
f. Total (1.a.vi. + 1.b. + 1.c. + 1.d. + 1.e.)	580,475,152	281,081,802	137,488,403	35,236,800	1,034,282,157
2. Actuarial Value of Assets	570,029,318	265,607,709	123,643,676	40,323,504	999,604,207
3. Unfunded Actuarial Accrued Liability (UAAL) (1.f. -2.)	10,445,834	15,474,093	13,844,727	(5,086,704)	34,677,950
4. Funded Ratio (2. / 1.f.)	98.20%	94.49%	89.93%	114.44%	96.65%
5. Maturity Ratio [(1.b. + 1.c. + 1.d.) / 1.f.]	62.99%	54.57%	56.69%	76.00%	60.31%
6. Employer Contribution for Fiscal 2020					
Total Normal Cost	7,211,715	5,025,834	1,295,732	456,593	13,989,874
Member Contribution	(1,777,065)	(1,282,279)	(347,653)	(140,640)	(3,547,637)
Administrative Expense	419,615	193,578	89,326	29,883	732,402
UAAL Contribution	792,084	1,173,365	1,049,814	(385,713)	2,629,550
Timing Adjustment	217,936	172,092	69,926	(2,442)	457,512
Total Employer Contribution Dollar (Not less than 0)	6,864,285	5,282,590	2,157,145	0	14,261,701 <sup>1</sup>
Projected Member Pay	62,726,775	29,023,950	9,817,166	5,251,083	106,818,974
Total Employer Contribution (% of Pay)	10.94%	18.20%	21.97%	0.00%	13.35%
7. Discount Rate	7.00%	7.00%	7.00%	7.00%	
8. Amortization payments increase assumption	5.00%	5.00%	5.00%	5.00%	
9. Amortization period for 2020 contribution <sup>2</sup>	15	15	15	15	

<sup>1</sup> Total ER contribution is a sum of the individual ER amounts and does not add up to the items above because one group is capped at \$0 rather than negative

<sup>2</sup> Closed 20-year period beginning with December 31, 2013 Valuation

**Section 1.3 - Actuarial (Gain) / Loss (\$'s in 000's)**

	<b>General County</b>	<b>Sheriff's Department</b>	<b>Road Commission</b>	<b>Martha T. Berry</b>	<b>Totals<sup>1</sup></b>
1. Total Actuarial Accrued Liability					
a. Actuarial Accrued Liability at December 31, 2017	592,534	263,668	121,605	35,303	1,013,110
b. Normal Cost at December 31, 2017	9,464	5,125	1,696	666	16,951
c. Interest on a. + b. to End of Year	43,645	19,487	8,939	2,608	74,679
d. Benefit Payments and Refund of Contributions with Interest to End of Year	41,178	16,314	8,791	2,897	69,180
e. Effect of Assumption and Plan Changes	<u>(7,312)</u>	<u>11,735</u>	<u>2,335</u>	<u>(535)</u>	<u>6,223</u>
f. Expected Actuarial Accrued Liability (a. + b. + c. – d. + e.)	597,153	283,701	125,784	35,145	1,041,783
2. Actuarial Accrued Liability at December 31, 2018	<u>580,475</u>	<u>281,082</u>	<u>137,488</u>	<u>35,237</u>	<u>1,034,282</u>
3. Liability (Gain) / Loss (2. – 1.f.)	(16,678)	(2,619)	11,704	92	(7,501)
4. Expected Actuarial Value of Assets					
a. Actuarial Value of Assets at December 31, 2017	567,659	261,875	120,841	40,427	990,803
b. Interest on a. to End of Year	41,155	18,986	8,761	2,931	71,833
c. Contribution Made	14,351	6,606	5,321	722	27,000
d. Interest on c. to End of Year	520	239	193	26	979
e. Benefit Payments and Refund of Contributions with Interest to End of Year	<u>41,178</u>	<u>16,314</u>	<u>8,791</u>	<u>2,897</u>	<u>69,180</u>
f. Expected Actuarial Value of Assets at December 31, 2018 (a. + b. + c. + d. – e.)	582,507	271,392	126,325	41,209	1,021,435
5. Actuarial Value of Assets as of December 31, 2018	<u>570,029</u>	<u>265,608</u>	<u>123,644</u>	<u>40,324</u>	<u>999,605</u>
6. Actuarial Asset (Gain) / Loss (4.f. -5.)	12,478	5,784	2,681	885	21,830
7. Actuarial (Gain) / Loss (3. + 6.)	(4,200)	3,165	14,385	977	14,329

<sup>1</sup> Numbers may not add due to rounding.

## Section 1.4 - Actuarial Balance Sheet

<b>Financial Resources</b>	<b>December 31, 2018</b>
1. Actuarial Value of Assets	999,604,207
2. Present Value of Future Contributions	
a. Expected Member Contributions	25,612,545
b. Employer Normal Cost	79,699,713
c. State Appropriations	<u>0</u>
d. Total	105,312,258
3. Unfunded Actuarial Accrued Liability/(Reserve)	34,677,950
4. Total Assets [1. + 2.(d) + 3.]	1,139,594,415

<b>Benefit Obligations</b>	<b>December 31, 2018</b>
1. Present Value of Future Benefits	
a. Active members	384,119,577
b. Inactive members	25,494,159
c. Retirees, disabilities and beneficiaries	598,252,717
d. DROP members	<u>131,727,962</u>
e. Total	1,139,594,415

**Section 1.5 - History of UAAL and Funded Ratio (\$'s in 000's)**

<b>Valuation Date</b>	<b>Actuarial Value of Assets (AVA) (a)</b>	<b>Actuarial Accrued Liability (AAL) (b)</b>	<b>Unfunded Actuarial Accrued Liability (UAAL) (b-a)</b>	<b>Funded Ratio (AVA as a % of AAL) (a/b)</b>	<b>Covered Payroll (c)</b>	<b>UAAL as a Percentage of Covered Payroll (b-a)/(c)</b>
December 31, 2007	847,305	772,650	(74,655)	109.7%	126,696	(58.9)%
December 31, 2008	855,266	805,888	(49,377)	106.1%	121,823	(40.5)%
December 31, 2009	866,357	814,564	(51,793)	106.4%	116,523	(44.4)%
December 31, 2010	862,916	837,168	(25,748)	103.1%	110,795	(23.2)%
December 31, 2011	828,692	854,324	25,632	97.0%	108,900	23.5%
December 31, 2012	795,606	867,219	71,613	91.7%	105,392	67.9%
December 31, 2013	837,653	884,042	46,389	94.8%	102,253	45.4%
December 31, 2014	882,565	911,096	28,531	96.9%	110,159	25.9%
December 31, 2015	902,931	977,566	74,636	92.4%	110,558	67.5%
December 31, 2016	940,494	1,019,138	78,644	92.3%	122,480	64.2%
December 31, 2017	990,803	1,013,110	22,307	97.8%	112,878	19.8%
December 31, 2018	999,604	1,034,282	34,678	96.6%	107,524	32.3%

**Section 1.6 - Solvency Test (\$'s in 000's)**

Valuation Date	Aggregate Accrued Liability For			Valuation Assets	Portion of Accrued Liabilities Covered by Assets		
	(1) Active Member Contributions	(2) Inactive Members	(3) Active Members (Employer- Financed Portion)		(1)	(2)	(3)
December 31, 2012	45,004	589,270	232,945	795,606	100.00%	100.00%	69.26%
December 31, 2013	45,727	627,384	210,931	837,653	100.00%	100.00%	78.01%
December 31, 2014	46,460	640,125	224,511	882,565	100.00%	100.00%	87.29%
December 31, 2015	41,678	709,409	226,479	902,931	100.00%	100.00%	67.05%
December 31, 2016	42,682	723,523	252,933	940,494	100.00%	100.00%	68.91%
December 31, 2017	42,985	737,059	233,066	990,803	100.00%	100.00%	90.43%
December 31, 2018	45,787	755,475	233,020	999,604	100.00%	100.00%	85.12%



## Section 2: Plan Assets

### Section 2.1 - Summary of Fair Value of Assets

Asset Category	Fair Value as of December 31, 2018		Fair Value as of December 31, 2017	
	Amount	%	Amount	%
1. Cash and Short-Term Investments				
a. Cash and cash equivalents	77,592,945	8.23%	32,630,883	3.13%
b. Other short-term	<u>1,750</u>	<u>0.00%</u>	<u>1,504</u>	<u>0.00%</u>
c. Total	77,594,695	8.23%	32,632,387	3.13%
2. Investments at Fair Value				
a. U.S. Treasury and agencies	0	0.00%	0	0.00%
b. Fixed Income	62,004,730	6.57%	68,155,546	6.53%
c. Domestic Stocks and Equity	547,261,130	58.03%	653,997,841	62.69%
d. International Equity	69,935,791	7.41%	22,170,970	2.13%
e. Limited Partnership	<u>186,418,220</u>	<u>19.76%</u>	<u>266,268,346</u>	<u>25.52%</u>
f. Total	865,619,871	91.77%	1,010,592,703	96.87%
3. Other Assets	0	0.00%	0	0.00%
4. Total Assets (1.c. + 2.f. + 3.)	943,214,566	100.00%	1,043,225,090	100.00%
5. Receivables				
a. Interest and Dividends	514,914		837,471	
b. Investments Sold	0		0	
c. Other Receivables	<u>845,939</u>		<u>172,497</u>	
d. Total	1,360,853		1,009,968	
6. Payables				
a. Payable for Investments Purchased	0		0	
b. Securities Lending Obligation in Excess of Collateral	0		0	
c. Accounts Payable and Accrued Liabilities	<u>7,487,487</u>		<u>6,862,193</u>	
d. Total	7,487,487		6,862,193	
7. Net Assets for Pension [4. + 5.d. – 6.d.]	937,087,932		1,037,372,865	

## Section 2.2 - Changes in Fair Value of Assets

Transactions	December 31, 2018	December 31, 2017
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### Additions

1. Contributions		
a. Contributions from Employers	23,747,047	21,672,813
b. Contributions from Plan Members	<u>3,252,673</u>	<u>3,451,637</u>
c. Total	26,999,720	25,124,450
2. Net Investment Income		
a. Interest and Dividends	8,397,859	8,278,371
b. Net Appreciation(Depreciation)	(61,642,515)	149,198,452
c. Rental Income	0	0
d. Net Securities Lending Income	0	0
e. Securities Lending Unrealized Gain/(Loss)	0	0
f. Miscellaneous	<u>0</u>	<u>0</u>
g. Total	(53,244,656)	157,476,823
h. Investment Expense	<u>(6,569,384)</u>	<u>(7,132,144)</u>
i. Net Investment Income	(59,814,040)	150,344,679
3. Total Additions	(32,814,320)	175,469,129

### Deductions

4. Benefit Payments and Refunds		
a. Retirement Benefits	66,297,751	65,895,203
b. Refund of Contributions	461,792	327,067
c. Death	0	0
d. Supplemental Payment	0	0
e. Administrative Expenses	<u>711,070</u>	<u>673,612</u>
f. Total Deductions	67,470,613	66,895,882
5. Net Increase	(100,284,933)	108,573,247
6. Net Assets Held in Trust for Pension Benefits		
a. Beginning of Year	1,037,372,865	928,799,618
b. End of Year	937,087,932	1,037,372,865



## Section 2.3 - Actuarial Value of Assets (cont'd)

### Allocation of Retirement Systems Assets

	General County	Sheriff's Department	Road Commission	Martha T. Berry	Total
1. Valuation assets at start of year	567,659,409	261,875,404	120,840,728	40,427,021	990,802,562
2. Employee contributions	1,702,181	1,111,573	320,899	118,020	3,252,673
3. Employer contributions	12,648,696	5,494,392	5,000,000	603,959	23,747,047
4. Benefits paid	39,375,017	15,715,424	8,469,741	2,737,569	66,297,751
5. Refund of contributions	362,053	28,145	13,700	57,894	461,792
6. Administrative expense allocated on BOY asset value	<u>407,393</u>	<u>187,940</u>	<u>86,724</u>	<u>29,013</u>	<u>711,070</u>
7. Average valuation assets [1. + 0.5 * {2. + 3. - 4. - 5. - 6.}]	554,762,616	257,212,632	119,216,095	39,375,773	970,567,116
8. Investment income allocated on average valuation assets	28,163,495	13,057,849	6,052,214	1,998,980	49,272,538
9. Transfer in	0	0	0	0	0
Transfer out	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Net transfer of assets	0	0	0	0	0
10. Valuation assets at end of year [1. + 2. +3. - 4. - 5. - 6. + 8. + 9.]	570,029,318	265,607,709	123,643,676	40,323,504	999,604,207
11. Total Revenues [2. +3. + 8.]	42,514,372	19,663,814	11,373,113	2,720,959	76,272,258
Percentage of revenue attributable to:					
Employee contributions	4.0%	5.7%	2.8%	4.3%	4.3%
Employer contributions	29.8%	27.9%	44.0%	22.2%	31.1%
Investment income	66.2%	66.4%	53.2%	73.5%	64.6%
12. Total Expenditures [4. + 5. + 6.]	40,144,463	15,931,509	8,570,165	2,824,476	67,470,613
Percentage of expenditures attributable to:					
Benefits paid	98.1%	98.6%	98.8%	97.0%	98.2%
Refund of contributions	0.9%	0.2%	0.2%	2.0%	0.7%
Administrative expenses	1.0%	1.2%	1.0%	1.0%	1.1%

**Section 2.4 - Historical Asset Rate of Return**

<b>Year Ending December 31</b>	<b>Actuarial Value of Assets</b>	<b>Market Value of Assets</b>
2011	0.15%	(1.42)%
2012	0.11%	11.51%
2013	10.55%	20.90%
2014	9.47%	7.22%
2015	6.86%	(1.73)%
2016	8.74%	9.58%
2017	10.01%	16.56%
2018	5.08%	(5.88)%

**Section 2.5 - Forecast of Expected Benefit Payments (\$000)**

<b>Year Ending December 31</b>	<b>Active Employees</b>	<b>Retired , Disabled, Beneficiary, and Deferred Vested Participants</b>	<b>DROP Participants</b>	<b>Grand Total</b>
2019	669	57,321	26,273	84,263
2020	1,297	56,062	11,299	68,658
2021	2,101	55,371	10,781	68,253
2022	2,984	54,628	11,951	69,563
2023	9,691	54,027	9,934	73,652
2024	13,489	53,215	8,026	74,730
2025	16,536	52,385	8,003	76,924
2026	19,723	51,580	7,977	79,280
2027	22,591	50,629	7,949	81,169
2028	26,672	49,599	7,905	84,176
2029	27,944	48,562	7,863	84,369
2030	31,282	47,434	7,804	86,520
2031	34,952	46,339	7,744	89,035
2032	40,159	45,110	7,684	92,953
2033	40,206	43,953	7,619	91,778
2034	41,965	42,728	7,549	92,242
2035	45,342	41,450	7,473	94,265
2036	45,697	39,991	7,388	93,076
2037	47,148	38,547	7,294	92,989
2038	48,182	36,948	7,191	92,321
2039	49,343	35,344	7,076	91,763
2040	51,258	33,644	6,950	91,852
2041	54,590	31,954	6,810	93,354
2042	58,180	30,209	6,657	95,046
2043	58,266	28,439	6,489	93,194
2044	56,925	26,699	6,305	89,929
2045	56,407	24,940	6,105	87,452
2046	55,766	23,209	5,888	84,863
2047	54,979	21,494	5,655	82,128
2048	54,164	19,817	5,406	79,387
2049	53,220	18,188	5,142	76,550

## Section 2.6 – Retiree Reserve Balances

The liabilities for all divisions other than Martha T. Berry are greater than the reported assets allocated to the retiree reserve balances as of December 31, 2018. The liabilities and reserves are shown below:

	General County	Sheriff's Department	Road Commission	Martha T. Berry	Total
1. Retiree Liability	426,545,542	176,467,773	99,750,502	27,216,862	729,980,679
2. Retiree Reserve	<u>420,116,563</u>	<u>170,432,372</u>	<u>82,936,462</u>	<u>27,322,239</u>	<u>700,807,636</u>
3. Shortfall	6,428,979	6,035,401	16,814,040	(105,377)	29,173,043

Reserve Accounts	Amount
1. Member Contributions	45,786,814
2. Reserve for benefits now paid	700,807,636
3. Reserve for future benefits	190,493,482
4. Supplemental reserve	<u>0</u>
5. Total	937,087,932

## Section 3: Member Data

### Section 3.1 - Summary of Members Included

As of December 31	General County		Sheriff's Department		Road Commission		Martha T. Berry		Total	
	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017
<b>Active Members</b>										
1. Number	1,130	1,212	360	367	150	163	111	100	1,751	1,842
2. Average Age	48.4	47.4	41.4	40.5	46.0	45.0	45.6	45.9	46.6	45.7
3. Avg. Credited Service	10.9	10.2	13.6	12.7	15.7	14.9	7.7	7.5	11.6	10.9
4. Avg. Annual Earnings	53,809	53,594	76,581	75,408	64,048	62,288	45,252	47,093	58,825	58,357
5. Total Annual Earnings	60,803,836	64,955,709	27,569,044	27,674,691	9,607,130	10,153,004	5,022,962	4,709,328	103,002,972	107,492,731
<b>Active Termination Benefit Only</b>										
1. Number	718		103		43		274		1,138	
<b>Retirees, Disabled and Beneficiaries in Pay Status</b>										
1. Number	1,869	1,824	339	331	295	286	189	192	2,692	2,633
2. Average Age	70.4	70.2	64.4	64.3	70.6	70.6	71.5	70.8	69.8	69.6
3. Avg. Monthly Benefit	1,502	1,492	3,170	3,093	2,044	2,009	1,099	1,084	1,743	1,719
<b>DROP Participants</b>										
1. Number	195	239	33	43	47	29	6	8	281	319
2. Average Age	59.5	59.1	54.8	54.0	56.6	57.7	58.0	57.1	58.4	58.2
3. Avg. Monthly Benefit	2,053	2,039	4,088	4,016	2,773	2,783	1,691	1,491	2,405	2,360
<b>Vested Terminated Members</b>										
1. Number	245	236	24	21	25	21	20	15	314	293
2. Average Age	50.6	50.3	53.9	49.8	51.5	49.6	53.2	52.4	51.1	50.3
3. Avg. Monthly Benefit	947	909	1,955	1,891	1,461	1,346	771	791	1,053	998
<b>Non-vested and Owed Refund</b>										
1. Number	232	237	26	27	2	1	96	110	356	375
2. Average Payoff	2,624	2,586	920	1,150	6,870	10,828	751	681	2,018	1,929
<b>Total Number of Members</b>	<b>4,389</b>	<b>3,748</b>	<b>885</b>	<b>789</b>	<b>562</b>	<b>500</b>	<b>696</b>	<b>425</b>	<b>6,532</b>	<b>5,462</b>



**Section 3.2 - Age and Service Distribution of Active Members as of December 31, 2018 – Total**

Attained Age		0-4	5-9	10-14	15-19	20-24	25-29	30-34	Over 34	Total
15-19	Number	0	0	0	0	0	0	0	0	0
	Total Salary									\$0
	Average Salary									\$0
20-24	Number	7	1	0	0	0	0	0	0	8
	Total Salary									\$371,278
	Average Salary									\$46,410
25-29	Number	68	17	0	0	0	0	0	0	85
	Total Salary									\$4,848,034
	Average Salary									\$57,036
30-34	Number	65	55	14	2	0	1	0	0	137
	Total Salary									\$7,742,749
	Average Salary									\$56,516
35-39	Number	58	48	56	52	0	1	0	0	215
	Total Salary									\$13,125,270
	Average Salary									\$61,048
40-44	Number	49	56	63	102	32	1	0	0	303
	Total Salary									\$18,515,775
	Average Salary									\$61,108
45-49	Number	51	49	70	76	101	27	2	0	376
	Total Salary									\$23,906,863
	Average Salary									\$63,582
50-54	Number	36	54	63	76	40	7	6	1	283
	Total Salary									\$16,455,559
	Average Salary									\$58,147
55-59	Number	30	45	57	44	9	6	1	1	193
	Total Salary									\$10,468,083
	Average Salary									\$54,239
60-64	Number	28	30	22	19	4	3	0	1	107
	Total Salary									\$5,572,272
	Average Salary									\$52,077
65-69	Number	4	10	9	5	1	0	0	0	29
	Total Salary									\$1,396,298
	Average Salary									\$48,148
70+	Number	2	2	4	4	2	0	1	0	15
	Total Salary									\$600,790
	Average Salary									\$40,053
<b>Total</b>	Number	398	367	358	380	189	46	10	3	1,751
	Total Salary	\$20,107,749	\$21,070,040	\$20,776,532	\$23,669,445	\$13,697,491	\$2,950,035	\$511,905	\$219,775	\$103,002,972
	Average Salary	\$50,522	\$57,412	\$58,035	\$62,288	\$72,473	\$64,131	\$51,191	\$73,258	\$58,825

**Section 3.2 - Age and Service Distribution of Active Members as of December 31, 2018 – General County (continued)**

Attained Age		5-9	5-9	10-14	15-19	20-24	25-29	30-34	Over 34	Total
15-19	Number	0	0	0	0	0	0	0	0	0
	Total Salary									\$0
	Average Salary									\$0
20-24	Number	2	1	0	0	0	0	0	0	3
	Total Salary									\$125,931
	Average Salary									\$41,977
25-29	Number	22	3	0	0	0	0	0	0	25
	Total Salary									\$1,092,306
	Average Salary									\$43,692
30-34	Number	48	31	4	0	0	1	0	0	84
	Total Salary									\$4,254,360
	Average Salary									\$50,647
35-39	Number	37	30	29	16	0	1	0	0	113
	Total Salary									\$6,255,957
	Average Salary									\$55,362
40-44	Number	35	50	44	48	12	1	0	0	190
	Total Salary									\$10,568,037
	Average Salary									\$55,621
45-49	Number	38	39	50	46	33	8	2	0	216
	Total Salary									\$12,681,726
	Average Salary									\$58,712
50-54	Number	30	45	53	53	16	7	5	1	210
	Total Salary									\$11,151,156
	Average Salary									\$53,101
55-59	Number	24	36	50	32	8	6	1	1	158
	Total Salary									\$8,331,172
	Average Salary									\$52,729
60-64	Number	22	26	20	16	1	3	0	1	89
	Total Salary									\$4,531,547
	Average Salary									\$50,916
65-69	Number	4	9	8	5	1	0	0	0	27
	Total Salary									\$1,210,854
	Average Salary									\$44,846
70+	Number	2	2	4	4	2	0	1	0	15
	Total Salary									\$600,790
	Average Salary									\$40,053
<b>Total</b>	Number	264	272	262	220	73	27	9	3	1,130
	Total Salary	\$12,710,740	\$14,742,049	\$14,489,592	\$12,347,272	\$4,058,773	\$1,779,653	\$455,982	\$219,775	\$60,803,836
	Average Salary	\$48,147	\$54,199	\$55,304	\$56,124	\$55,600	\$65,913	\$50,665	\$73,258	\$53,809

**Section 3.2 - Age and Service Distribution of Active Members as of December 31, 2018 – Sheriff’s Department (continued)**

Attained Age		0-4	5-9	10-14	15-19	20-24	25-29	30-34	Over 34	Total
15-19	Number	0	0	0	0	0	0	0	0	0
	Total Salary									\$0
	Average Salary									\$0
20-24	Number	3	0	0	0	0	0	0	0	3
	Total Salary									\$168,358
	Average Salary									\$56,119
25-29	Number	33	13	0	0	0	0	0	0	46
	Total Salary									\$3,116,599
	Average Salary									\$67,752
30-34	Number	12	22	8	2	0	0	0	0	44
	Total Salary									\$3,031,253
	Average Salary									\$68,892
35-39	Number	6	13	18	23	0	0	0	0	60
	Total Salary									\$4,576,718
	Average Salary									\$76,279
40-44	Number	3	1	11	37	14	0	0	0	66
	Total Salary									\$5,242,450
	Average Salary									\$79,431
45-49	Number	5	2	12	15	52	1	0	0	87
	Total Salary									\$7,012,679
	Average Salary									\$80,606
50-54	Number	0	1	6	10	20	0	0	0	37
	Total Salary									\$3,153,609
	Average Salary									\$85,233
55-59	Number	0	1	3	9	1	0	0	0	14
	Total Salary									\$1,013,333
	Average Salary									\$72,381
60-64	Number	1	0	0	0	2	0	0	0	3
	Total Salary									\$254,045
	Average Salary									\$84,682
65-69	Number	0	0	0	0	0	0	0	0	0
	Total Salary									\$0
	Average Salary									\$0
70+	Number	0	0	0	0	0	0	0	0	0
	Total Salary									\$0
	Average Salary									\$0
<b>Total</b>	Number	63	53	58	96	89	1	0	0	360
	Total Salary	\$3,998,162	\$3,953,887	\$4,226,351	\$7,575,981	\$7,760,354	\$54,309	\$0	\$0	\$27,569,044
	Average Salary	\$63,463	\$74,602	\$72,868	\$78,916	\$87,195	\$54,309	\$0	\$0	\$76,581

**Section 3.2 - Age and Service Distribution of Active Members as of December 31, 2018 – Road Commission (continued)**

Attained Age		0-4	5-9	10-14	15-19	20-24	25-29	30-34	Over 34	Total
15-19	Number	0	0	0	0	0	0	0	0	0
	Total Salary									\$0
	Average Salary									\$0
20-24	Number	1	0	0	0	0	0	0	0	1
	Total Salary									\$42,128
	Average Salary									\$42,128
25-29	Number	4	0	0	0	0	0	0	0	4
	Total Salary									\$204,317
	Average Salary									\$51,079
30-34	Number	1	1	2	0	0	0	0	0	4
	Total Salary									\$227,957
	Average Salary									\$56,989
35-39	Number	4	2	5	12	0	0	0	0	23
	Total Salary									\$1,365,921
	Average Salary									\$59,388
40-44	Number	3	2	5	15	6	0	0	0	31
	Total Salary									\$1,985,440
	Average Salary									\$64,046
45-49	Number	1	4	3	11	14	15	0	0	48
	Total Salary									\$3,197,359
	Average Salary									\$66,612
50-54	Number	2	3	4	9	4	0	1	0	23
	Total Salary									\$1,554,818
	Average Salary									\$67,601
55-59	Number	1	3	2	3	0	0	0	0	9
	Total Salary									\$538,983
	Average Salary									\$59,887
60-64	Number	0	1	1	3	1	0	0	0	6
	Total Salary									\$386,507
	Average Salary									\$64,418
65-69	Number	0	0	1	0	0	0	0	0	1
	Total Salary									\$103,700
	Average Salary									\$103,700
70+	Number	0	0	0	0	0	0	0	0	0
	Total Salary									\$0
	Average Salary									\$0
<b>Total</b>	Number	17	16	23	53	25	15	1	0	150
	Total Salary	\$954,451	\$1,047,545	\$1,409,687	\$3,340,330	\$1,794,784	\$1,004,410	\$55,923	\$0	\$9,607,130
	Average Salary	\$56,144	\$65,472	\$61,291	\$63,025	\$71,791	\$66,961	\$55,923	\$0	\$64,048

**Section 3.2 - Age and Service Distribution of Active Members as of December 31, 2018 – Martha T. Berry (continued)**

Attained Age		0-4	5-9	10-14	15-19	20-24	25-29	30-34	Over 34	Total
15-19	Number	0	0	0	0	0	0	0	0	0
	Total Salary									\$0
	Average Salary									\$0
20-24	Number	1	0	0	0	0	0	0	0	1
	Total Salary									\$34,861
	Average Salary									\$34,861
25-29	Number	9	1	0	0	0	0	0	0	10
	Total Salary									\$434,812
	Average Salary									\$43,481
30-34	Number	4	1	0	0	0	0	0	0	5
	Total Salary									\$229,180
	Average Salary									\$45,836
35-39	Number	11	3	4	1	0	0	0	0	19
	Total Salary									\$926,674
	Average Salary									\$48,772
40-44	Number	8	3	3	2	0	0	0	0	16
	Total Salary									\$719,848
	Average Salary									\$44,990
45-49	Number	7	4	5	4	2	3	0	0	25
	Total Salary									\$1,015,100
	Average Salary									\$40,604
50-54	Number	4	5	0	4	0	0	0	0	13
	Total Salary									\$595,976
	Average Salary									\$45,844
55-59	Number	5	5	2	0	0	0	0	0	12
	Total Salary									\$584,595
	Average Salary									\$48,716
60-64	Number	5	3	1	0	0	0	0	0	9
	Total Salary									\$400,173
	Average Salary									\$44,464
65-69	Number	0	1	0	0	0	0	0	0	1
	Total Salary									\$81,744
	Average Salary									\$81,744
70+	Number	0	0	0	0	0	0	0	0	0
	Total Salary									\$0
	Average Salary									\$0
<b>Total</b>	Number	54	26	15	11	2	3	0	0	111
	Total Salary	\$2,444,396	\$1,326,559	\$650,903	\$405,861	\$83,579	\$111,663	\$0	\$0	\$5,022,962
	Average Salary	\$45,267	\$51,022	\$43,394	\$36,896	\$41,790	\$37,221	\$0	\$0	\$45,252

### Section 3.3 - Member Data Reconciliation

	Inactive Members							
	Active <sup>1</sup>	Deferred Benefits	Termination Owed Refund	DROP	Retired Members	Disabled Members	Beneficiaries	Total
As of December 31, 2017	1,842	293	375	319	2,181	88	364	5,462
Changes due to:								
Age/Service Retirements	(20)	(16)	0	(64)	100	0	0	0
Disability Retirements	(8)	0	0	0	(1)	9	0	0
Deaths Without Beneficiary	0	0	0	0	(32)	(2)	(20)	(54)
Deaths With Beneficiary	(1)	4	0	0	(26)	(4)	38	11
Non-Vested Terminations	(1)	0	0	0	0	0	0	(1)
Terminations Owed Refund	(12)	0	12	0	0	0	0	0
Vested Terminations	(41)	41	0	0	0	0	0	0
Rehires	5	(5)	0	0	0	0	0	0
Cash-Outs	(52)	(3)0	(32)	0	0	0	0	(87)
Expiration of Benefits	0	(1)	0	0	0	0	(3)	(4)
Data Corrections	65	1	1	0	0	3	0	67
Transfers Out	0	0	0	0	0	0	0	0
DROP	(26)	0	0	26	0	0	0	0
New Entrants	0	0	0	0	0	0	0	0
<b>Net Change</b>	<b>(91)</b>	<b>21</b>	<b>(19)</b>	<b>(38)</b>	<b>41</b>	<b>3</b>	<b>15</b>	<b>(68)</b>
As of December 31, 2018	1,751	314	356	281	2,222	91	379	5,394

<sup>1</sup> The count as of 12/31/2018 excludes 1,138 active participants who are eligible for Termination Benefit Only

### Section 3.3 - Member Data Reconciliation – General County

	Inactive Members							
	Active	Deferred Benefits	Termination Owed Refund	DROP	Retired Members	Disabled Members	Beneficiaries	Total
As of December 31, 2017	1,212	236	237	239	1,563	37	224	3,748
Changes due to:								
Age/Service Retirements	(16)	(15)	0	(41)	72	0	0	0
Disability Retirements	(6)	0	0	0	0	6	0	0
Deaths Without Beneficiary	0	0	0	0	(23)	(1)	(13)	(37)
Deaths With Beneficiary	(1)	1	0	0	(17)	(1)	25	7
Non-Vested Terminations	(1)	0	0	0	0	0	0	(1)
Terminations Owed Refund	(8)	0	8	0	0	0	0	0
Vested Terminations	(32)	32	0	0	0	0	0	0
Rehires	3	(3)	0	0	0	0	0	0
Cash-Outs	(40)	(3)	(12)	0	0	0	0	(55)
Expiration of Benefits	0	(1)	0	0	0	0	(3)	(4)
Data Corrections	38	(2)	0	0	0	0	0	36
Transfers Out	0	0	(1)	(22)	0	0	0	(23)
DROP	(19)	0	0	19	0	0	0	0
New Entrants	0	0	0	0	0	0	0	0
<b>Net Change</b>	<b>(82)</b>	<b>9</b>	<b>(5)</b>	<b>(44)</b>	<b>32</b>	<b>4</b>	<b>9</b>	<b>(77)</b>
As of December 31, 2018	1,130	245	232	195	1,595	41	233	3,671

### Section 3.3 - Member Data Reconciliation – Sheriff’s Department

	Inactive Members							
	Active	Deferred Benefits	Termination Owed Refund	DROP	Retired Members	Disabled Members	Beneficiaries	Total
As of December 31, 2017	367	21	27	43	249	24	58	789
Changes due to:								
Age/Service Retirements	(2)	0	0	(12)	14	0	0	0
Disability Retirements	(1)	0	0	0	(1)	2	0	0
Deaths Without Beneficiary	0	0	0	0	(2)	(1)	(5)	(8)
Deaths with Beneficiary	0	2	0	0	(5)	0	6	3
Non-Vested Terminations	0	0	0	0	0	0	0	0
Terminations Owed Refund	0	0	0	0	0	0	0	0
Vested Terminations	(1)	1	0	0	0	0	0	0
Rehires	1	0	0	0	0	0	0	1
Cash-Outs	(3)	0	(1)	0	0	0	0	(4)
Expiration of Benefits	0	0	0	0	0	0	0	0
Data Corrections	2	0	0	0	0	0	0	2
Transfers Out	0	0	0	(1)	0	0	0	(1)
DROP	(3)	0	0	3	0	0	0	0
New Entrants	0	0	0	0	0	0	0	0
<b>Net Change</b>	<b>(7)</b>	<b>3</b>	<b>(1)</b>	<b>(10)</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>(7)</b>
As of December 31, 2018	360	24	26	33	255	25	59	782



### Section 3.3 - Member Data Reconciliation – Road Commission

	Inactive Members							
	Active	Deferred Benefits	Termination Owed Refund	DROP	Retired Members	Disabled Members	Beneficiaries	Total
As of December 31, 2017	163	21	1	29	210	14	62	500
Changes due to:								
Age/Service Retirements	(2)	(1)	0	(6)	9	0	0	0
Disability Retirements	(1)	0	0	0	0	1	0	0
Deaths Without Beneficiary	0	0	0	0	(3)	0	(2)	(5)
Deaths With Beneficiary	0	1	0	0	(2)	(1)	4	2
Non-Vested Terminations	0	0	0	0	0	0	0	0
Terminations Owed Refund	(1)	0	1	0	0	0	0	0
Vested Terminations	(4)	4	0	0	0	0	0	0
Rehires	1	(1)	0	0	0	0	0	0
Cash-Outs	(3)	0	0	0	0	0	0	(3)
Expiration of Benefits	0	0	0	0	0	0	0	0
Data Corrections	1	1	0	0	3	0	0	5
Transfers Out	0	0	0	20	0	0	0	20
DROP	(4)	0	0	4	0	0	0	0
New Entrants	0	0	0	0	0	0	0	0
<b>Net Change</b>	<b>(13)</b>	<b>4</b>	<b>1</b>	<b>18</b>	<b>7</b>	<b>0</b>	<b>2</b>	<b>19</b>
As of December 31, 2018	150	25	2	47	217	14	64	519

### Section 3.3 - Member Data Reconciliation – Martha T Berry

	Inactive Members							
	Active	Deferred Benefits	Termination Owed Refund	DROP	Retired Members	Disabled Members	Beneficiaries	Total
As of December 31, 2017	100	15	110	8	159	13	20	425
Changes due to:								
Age/Service Retirements	0	0	0	(2)	2	0	0	0
Disability Retirements	0	0	0	0	0	0	0	0
Deaths Without Beneficiary	0	0	0	0	(4)	0	0	(4)
Deaths With Beneficiary	0	0	0	0	(2)	(2)	3	(1)
Non-Vested Terminations	0	0	0	0	0	0	0	0
Terminations Owed Refund	(3)	0	3	0	0	0	0	0
Vested Terminations	(4)	4	0	0	0	0	0	0
Rehires	0	0	0	0	0	0	0	0
Cash-Outs	(6)	0	(19)	0	0	0	0	(25)
Expiration of Benefits	0	0	0	0	0	0	0	0
Data Corrections	24	1	2	0	0	0	0	27
Transfers Out	0	0	0	0	0	0	0	0
DROP	0	0	0	0	0	0	0	0
New Entrants	0	0	0	0	0	0	0	0
<b>Net Change</b>	<b>11</b>	<b>5</b>	<b>(14)</b>	<b>(2)</b>	<b>(4)</b>	<b>(2)</b>	<b>3</b>	<b>(3)</b>
As of December 31, 2018	111	20	96	6	155	11	23	422

**Section 3.4 - Schedule of Active Member Data**

Valuation Date	Number					Annual Earnings	Annual Average Earnings	Percent Increase / (Decrease) in Average Earnings
	General County	Sheriff's Department	Road Commission	Martha T. Berry	Total			
December 31, 2010	1,452	401	230	174	2,257	110,795,240	49,090	
December 31, 2011	1,422	390	216	170	2,198	108,900,180	49,545	0.9%
December 31, 2012	1,334	376	213	156	2,079	105,391,874	50,694	2.3%
December 31, 2013	1,328	377	207	156	2,068	102,252,875	49,445	(2.5)%
December 31, 2014	1,392	380	214	148	2,134	110,159,044	51,621	4.4%
December 31, 2015	1,448	408	199	168	2,223	105,254,524	47,348	(8.3)%
December 31, 2016	1,322	380	189	129	2,020	116,574,389	57,710	21.9%
December 31, 2017	1,212	367	163	100	1,842	107,492,731	58,357	1.1%
December 31, 2018	1,130	360	150	111	1,751	103,002,972	58,825	0.8%

**Section 3.5 - Schedule of Inactive Member Data**

Valuation Date	Number					Annual Retirement Benefits	Average Annual Retirement Benefits
	General County	Sheriff's Department	Road Commission	Martha T. Berry	Total		
December 31, 2013	185	18	14	19	236	2,795,885	11,847
December 31, 2014	179	18	13	16	226	2,610,266	11,550
December 31, 2015	233	26	3	20	282	3,527,398	12,509
December 31, 2016	236	19	16	17	288	3,566,016	12,382
December 31, 2017	236	21	21	15	293	3,509,155	11,977
December 31, 2018	245	24	25	20	314	3,969,425	12,641

**Section 3.6 - Schedule of Retired Members by Type of Benefit and Option Elected**

Amount of Monthly Pension Benefit	Number of Recipients	Type of Pension Benefit			Option Selected			
		1	2	3	1	3	4	5
\$ 1 - \$ 300	98	54	43	1	69	5	20	4
301 - 600	330	246	75	9	172	30	57	71
601 - 900	394	310	69	15	179	40	63	112
901 - 1,200	330	272	41	17	132	40	60	98
1,201 - 1,500	250	209	30	11	102	32	40	76
1,501 - 1,800	217	175	27	15	91	23	35	68
1,801 - 2,100	198	158	30	10	69	29	53	47
2,101 - 2,400	181	162	15	4	50	24	49	58
2,401 - 2,700	146	131	14	1	48	21	32	45
2,701 - 3,000	133	122	10	1	34	13	43	43
3,001 - 3,300	102	87	14	1	28	8	32	34
3,301 - 3,600	79	75	2	2	14	6	24	35
3,601 - 3,900	59	54	3	2	14	6	20	19
3,901 - 4,200	43	41	1	1	7	4	13	19
Over \$4,200	132	126	5	1	31	9	50	42
<b>Totals</b>	<b>2,692</b>	<b>2,222</b>	<b>379</b>	<b>91</b>	<b>1,040</b>	<b>290</b>	<b>591</b>	<b>771</b>

- | Type of Pension Benefit | Option Selected        |
|-------------------------|------------------------|
| 1. Regular retirement   | 1 = Straight Life      |
| 2. Survivor payment     | 3 = Years Certain      |
| 3. Disability           | 4 = Joint and Survivor |
|                         | 5 = Pop-Up             |

**Section 3.6a - Schedule of DROP Participants by Option Elected**

Amount of Monthly Pension Benefit	Number of Recipients	Option Selected			
		1	3	4	5
\$ 1 - \$ 300	1	1	0	0	0
301 - 600	1	1	0	0	0
601 - 900	18	6	1	1	10
901 - 1,200	33	8	1	8	16
1,201 - 1,500	24	7	1	4	12
1,501 - 1,800	28	5	2	5	16
1,801 - 2,100	25	7	6	4	8
2,101 - 2,400	25	5	1	6	13
2,401 - 2,700	21	6	1	3	11
2,701 - 3,000	25	5	1	4	15
3,001 - 3,300	18	7	2	1	8
3,301 - 3,600	17	1	1	5	10
3,601 - 3,900	9	0	2	2	5
3,901 - 4,200	7	0	0	3	4
Over \$4,200	29	4	2	7	16
<b>Totals</b>	<b>281</b>	<b>63</b>	<b>21</b>	<b>53</b>	<b>144</b>

**Option Selected**

- 1 = Straight Life
- 3 = Years Certain
- 4 = Joint and Survivor
- 5 = Pop-Up

**Section 3.7 - Schedule of Benefit Payments**

Attained Age	Regular Retirement & Survivor Payment		Disability		Total	
	No.	Annual Allowances	No.	Annual Allowances	No.	Annual Allowances
Under 30	6	76,831	0	0	6	76,831
30-34	1	19,206	0	0	1	19,206
35-39	4	67,302	1	9,578	5	76,880
40-44	4	66,394	7	137,581	11	203,975
45-49	14	240,790	8	200,368	22	441,157
50-54	96	3,067,631	14	247,482	110	3,315,113
55-59	244	7,054,710	16	316,547	260	7,371,258
60-64	476	11,910,812	16	331,552	492	12,242,363
65-69	562	12,156,340	12	183,072	574	12,339,413
70-74	418	8,207,461	7	72,624	425	8,280,085
75	78	1,467,795	2	38,809	80	1,506,604
76	85	1,624,659	0	0	85	1,624,659
77	65	1,219,604	1	5,513	66	1,225,118
78	59	977,725	2	21,166	61	998,891
79	47	802,326	1	6,030	48	808,356
80	54	962,197	0	0	54	962,197
81	44	615,753	0	0	44	615,753
82	36	536,972	0	0	36	536,972
83	28	401,955	1	15,285	29	417,240
84	37	524,958	0	0	37	524,958
85	29	372,311	0	0	29	372,311
86	38	446,273	1	9,667	39	455,940
87	26	251,430	0	0	26	251,430
88	21	260,801	1	1,637	22	262,438
89	35	388,065	0	0	35	388,065
90	19	291,745	1	6,813	20	298,558
91	19	220,565	0	0	19	220,565
92	12	149,484	0	0	12	149,484
93	17	160,960	0	0	17	160,960
94	8	67,061	0	0	8	67,061
95	6	35,292	0	0	6	35,292
96	4	13,395	0	0	4	13,395
97	3	20,219	0	0	3	20,219
98	0	0	0	0	0	0
99	4	12,576	0	0	4	12,576
100	2	6,674	0	0	2	6,674
101	0	0	0	0	0	0
102	0	0	0	0	0	0
103+	0	0	0	0	0	0
<b>Total</b>	<b>2,601</b>	<b>54,698,270</b>	<b>91</b>	<b>1,603,725</b>	<b>2,692</b>	<b>56,301,996</b>

**Section 3.7a - Schedule of Benefit Payments**

<b>Deferred Vested Members</b>		
<b>Attained Age</b>	<b>No.</b>	<b>Estimated Annual Allowances</b>
Under 30	0	0
30	0	0
31	1	0
32	0	0
33	2	19,304
34	2	11,909
35	4	34,127
36	1	13,516
37	4	34,383
38	6	80,178
39	5	53,201
40	7	105,677
41	5	79,905
42	15	170,759
43	18	265,326
44	13	218,038
45	11	215,474
46	13	200,939
47	11	228,154
48	6	85,141
49	16	243,174
50	9	85,308
51	9	152,782
52	12	139,460
53	18	220,954
54	18	197,627
55	18	153,240
56	25	320,281
57	9	84,026
58	15	144,720
59	12	114,351
60	6	27,510
61	4	38,787
62	5	48,373
63	2	22,109
64	4	45,247
65	2	12,639
66	0	0
67	0	0
68	6	102,806
<b>Total</b>	<b>314</b>	<b>3,969,425</b>

**Section 3.7b - Schedule of Benefit Payments**

Attained Age	DROP Members	
	No.	Estimated Annual Allowances
Under 30	0	0
30	0	0
31	0	0
32	0	0
33	0	0
34	0	0
35	0	0
36	0	0
37	0	0
38	0	0
39	0	0
40	0	0
41	0	0
42	0	0
43	0	0
44	0	0
45	0	0
46	0	0
47	0	0
48	0	0
49	5	216,621
50	8	317,363
51	15	562,125
52	14	533,491
53	17	600,703
54	26	915,228
55	26	708,170
56	26	809,004
57	13	431,101
58	15	409,869
59	14	414,056
60	16	333,180
61	14	375,441
62	16	281,183
63	15	381,393
64	16	262,148
65	8	120,436
66	4	141,620
67	5	123,244
68	8	171,999
<b>Total</b>	<b>281</b>	<b>8,108,375</b>



# Section 4 - Actuarial Assumptions, Methods and Additional Information for Funding

## Valuation Date

December 31, 2018

## Actuarial Methods

### Actuarial Cost Method

Entry Age Normal

### Amortization Method

#### Period

15 years remaining. Initially established as 20 years with the December 31, 2013 actuarial valuation

#### Open or Closed

Closed - each year the amortization period is reduced by 1 year

### Aggregate or Layered basis

Aggregate - the total unfunded actuarial accrued liability (UAAL) as of the valuation date is amortized over the remaining period

### UAAL Payment Increase

The UAAL payments are developed such that they would increase by 5.00% per year

### Asset Valuation Method

The Actuarial Value of Assets is based on a 5 year smoothing method and is determined by spreading each year's investment return in excess of or below the expected return.

### Interest Rate and Inflation

Investment Rate of Return	7.00%
Inflation Assumption	3.00%

### Marriage Assumption

100% of males and 100% of females are married, with males three years older than their female spouse.

### Expense Load for Contribution Amount

Previous year's administrative expense increased by the inflation assumption of 3.00% and allocated by employer payroll. Administrative expenses are allocated based on the ratio of beginning of year actuarial value of assets for the asset allocation between groups in Section 2.3.

### Participant Data

All census data used in these calculations was supplied by the employer.

## Section 4 - Actuarial Assumptions, Methods and Additional Information for Funding (continued)

### Retirement Rates

According to the following rates upon the attainment of retirement eligibility.

Age	General County	Martha T. Berry	Road Commission	Sheriff's Department	Sheriff's Department	
	All Employees	All Employees	All Employees	<25 Years of Service	Retirement Service	25+ Years of Service
50	30%	30%	30%	-	25	75%
51	30%	30%	30%	-	26	50%
52	30%	30%	30%	-	27	50%
53	30%	30%	30%	-	28	50%
54	30%	30%	30%	-	29	50%
55	25%	25%	30%	-	30	50%
56	25%	25%	30%	-	31	50%
57	25%	25%	30%	-	32	50%
58	25%	25%	30%	-	33	50%
59	25%	25%	30%	-	34	50%
60	25%	25%	35%	25%	35 & Up	100%
61	25%	25%	35%	25%	-	-
62	25%	25%	50%	25%	-	-
63	25%	25%	50%	25%	-	-
64	25%	25%	50%	25%	-	-
65	25%	25%	100%	100%	-	-
66	25%	25%	100%	100%	-	-
67	25%	25%	100%	100%	-	-
68	25%	25%	100%	100%	-	-
69	25%	25%	100%	100%	-	-
70 & Up	100%	100%	100%	100%	-	-

## Section 4 - Actuarial Assumptions, Methods and Additional Information for Funding (continued)

### Disability Incidence

Sample rates of disability are shown in the following table:

<b>Disability Rates</b>	
<b>Age</b>	<b>% of Active Members Becoming Disabled within Next Year</b>
25	0.0675%
30	0.0825%
35	0.1125%
40	0.1650%
45	0.2700%
50	0.4575%
55	0.7575%
60	1.2450%

### Termination Rates

Sample rates of active members separating service are shown in the following table:

<b>% of Active Members Separating within Next Year</b>					
<b>Sample Age</b>	<b>Years of Service</b>	<b>General County</b>	<b>Sheriff's Department</b>	<b>Road Commission</b>	<b>Martha T Berry MCF</b>
ALL	0	11.00%	8.00%	6.50%	24.00%
	1	11.00%	8.00%	6.00%	18.00%
	2	8.00%	6.00%	5.50%	16.00%
	3	7.00%	3.00%	5.00%	12.00%
	4	6.00%	3.00%	4.50%	12.00%
25	5 & Over	11.60%	4.80%	5.00%	17.40%
30		10.60%	3.30%	4.00%	15.90%
35		8.60%	3.00%	4.00%	12.90%
40		6.60%	2.25%	3.00%	9.90%
45		4.60%	1.50%	2.00%	6.90%
50		3.60%	0.75%	1.00%	5.40%
55		3.50%	0.75%	1.00%	5.25%
60		3.00%	0.75%	1.00%	4.50%

## Section 4 - Actuarial Assumptions, Methods and Additional Information for Funding (continued)

### Mortality

RP-2014 (Base 2006) Mortality Tables adjusted by 105% for males and 110% for females, projected with Scale MP-2018 on a fully generational basis was used for Retired and Survivor members.

RP-2014 (Base 2006) Mortality Tables projected with Scale MP-2018 on a fully generational basis was used for Active and Deferred Vested members.

RP-2014 (Base 2006) Disabled Mortality Tables adjusted by 106% for males and 114% for females, projected with Scale MP-2018 on a fully generational basis was used for Disabled members.

### DROP Assumptions

75% of eligible participants are assumed to enter DROP and remain in DROP for 4 years.

### Salary Increase

Rates of salary increases are shown in the following table:

Years of Service	General County	Sheriff's Department	Road Commission	Martha T Berry MCF
0	12.00%	18.00%	15.00%	12.00%
1	8.00%	11.00%	9.00%	5.00%
2	6.00%	11.00%	6.00%	5.00%
3	6.00%	10.00%	6.00%	5.00%
4	6.00%	7.00%	3.00%	5.00%
5	6.00%	7.00%	3.00%	5.00%
6	4.00%	4.00%	3.00%	5.00%
7	4.00%	4.00%	3.00%	5.00%
8	3.00%	4.00%	3.00%	3.00%
9	3.00%	4.00%	3.00%	3.00%
10	3.00%	4.00%	3.00%	3.00%
11+	3.00%	4.00%	3.00%	3.00%

### Final Average Compensation Loads

General County & Martha T Berry	4.50%
Road Commission	6.00%
Sheriff's Department	
Command (hired before 11/1/1996)	11.00%
Correction Officers	1.00%
Dispatchers	1.00%
Others	0.00%

This load on pay is to approximate the accumulated sick time leave that gets factored into final benefit calculations.

## **Section 4 - Actuarial Assumptions, Methods and Additional Information for Funding (continued)**

### **Changes Since the Prior Valuation**

The actuarial assumptions and methods for funding purposes are the same as those used for the December 31, 2017 valuation report except as follows:

- The interest rate was changed from 7.25% to 7.00%.

As a result of the experience study, the following assumptions were changed:

- The mortality tables for active and deferred vested participants were changed to the RP-2014 (Base 2006) Mortality Tables, projected with scale MP-2018 on a fully generational basis.
- The mortality tables for healthy retirees were changed to the RP-2014 (Base 2006) Mortality Tables adjusted by 105% for males and 110% for females, projected with scale MP-2018 on a fully generational basis.
- The mortality tables for disabled retirees were changed to the RP-2014 (Base 2006) Disabled Mortality Tables adjusted by 106% for males and 114% for females, projected with scale MP-2018 on a fully generational basis.
- The number of eligible participants assumed to enter DROP was changed from 100% to 75%. The number of years a DROP participant is assumed to remain in DROP was changed from 5 years to 4 years.
- Salary scale, termination, disability, and retirement rates were all updated based on the results of the experience study.

## Section 5 – Summary of Plan Provisions

### Summary of DROP Provisions

Please refer to the Benefit Provision Summary for DROP eligibility provisions. The other provisions of the DROP are listed below:

- The DROP is a forward DROP.
- Members can DROP when they first become eligible for an unreduced benefit.
- Upon entering the DROP, 100% of the member's monthly retirement benefit will be credited to the DROP account.
- The DROP account will be credited with the same interest rate used to accumulate member contributions.
- The maximum DROP period is five years. Members may continue to work past the maximum DROP period, but no additional retirement benefits will be credited to the member's DROP account. Interest on the DROP account will continue to accrue for members working past the maximum DROP period.
- Member contributions to the Retirement System will cease upon entering the DROP.
- Upon actual retirement, the member would receive a monthly annuity equal to the accrued benefit credited to the DROP account under any form of payment available from the plan, and the lump sum amount accumulated in the DROP account. Members elect their form of payment at time of DROP.
- The monthly annuity as of the DROP date is calculated based on service, final average compensation and benefit provisions as of the DROP date less the annuity withdrawal reduction, if applicable; this amount is not changed for any subsequent changes in pay or benefit provisions. The annuity withdrawal is paid at the time of DROP.
- For POLC (Union 1 & 20) and MCDPSA (Union 26), interest is earned on the DROP account balance at the end of each month and shall be paid to the employee's DROP account no later than the last day of the following month.
- For POLC (Union 1), effective August 20, 2010, for new entries into DROP, upon reaching the five-year maximum DROP participation period, the DROP participant shall terminate his/her employment.
- For POAM (Union 7), effective August 6, 2010, an employee of Macomb County who is a member of the POAM-Deputies and Dispatchers, may voluntarily elect to participate in the DROP, upon obtaining the minimum age and service requirements for a normal service retirement.

## Section 5 – Summary of Plan Provisions (continued)

Benefit Provision Summary For General Employees									
Division Code	Division Name	Benefit Tier	Service Needed to Vest	DROP Eligible?	Retirement Eligibility (Age/Service)	Multiplier	Employer Maximum	FAC Period	Employee Contribution
0	General Non Union	Hired on or before 12/31/2001 or vested by 2/26/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
2	UAW Animal Shelter	Hired on or before 12/31/2001 or vested by 2/27/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
3	AFSCME Local 411	Hired on or before 12/31/2001 or vested by 2/27/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
6	Macomb County Environmental Health Association	Hired on or before 12/31/2001 or vested by 5/1/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
8	Teamsters 214 Court Reporters	Hired on or before 12/31/2001 or vested by 2/27/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
9	International Union of Operating Engineers (Boiler Operators)	Hired on or before 12/31/2001 or vested by 5/1/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
10	TPOAM Circuit Court Officers	Hired on or before 12/31/2001 or vested by 7/24/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
11	MNA Unit I Health Dept.	Hired on or before 12/31/2001 or vested by 5/1/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
12	UAW Local 412 Unit 49 Information Technology	Hired on or before 12/31/2001 or vested by 2/27/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
13	UAW Local 889 Specialized Offices	Hired on or before 12/31/2001 or vested by 2/27/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
15	Building Trades Association	Hired on or before 12/31/2001 or vested by 5/1/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%

\* Must be vested on 12/31/2012, otherwise not eligible for DROP.

\*\* Minimum Age 50

## Section 5 – Summary of Plan Provisions (continued)

Benefit Provision Summary For General Employees									
Division Code	Division Name	Benefit Tier	Service Needed to Vest	DROP Eligible?	Retirement Eligibility (Age/Service)	Multiplier	Employer Maximum	FAC Period	Employee Contribution
16	UAW Local 412 Unity 46 Assistant Prosecutors	Hired on or before 12/31/2001 or vested by 9/14/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
18	Teamsters Local 214 FOC/Circuit Court	Hired on or before 12/31/2001 or vested by 7/24/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
19	General	Hired on or before 12/31/2001 or vested by 2/27/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
21	POAM JJC	Hired on or before 12/31/2001 or vested by 5/1/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
24	UAW Local 889 MCCSA	Hired on or before 12/31/2001 or vested by 2/27/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
25	UAW Local 412 Unit 75 Supervisors	Hired on or before 12/31/2001 or vested by 2/27/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
27	TPOAM Macomb Co. Senior Service Employees Association	Hired on or before 12/31/2001 or vested by 2/27/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
28	TPOAM Juvenile Court & Justice Center Employees	Hired on or before 12/31/2001 or vested by 6/19/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
30	UAW Local 412 Unit 95 Assistant Corporation Counsel	Hired on or before 12/31/2001 or vested by 2/27/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
43	UAW Local 889 Probate Court/ Corporation Counsel	Hired on or before 12/31/2001 or vested by 6/19/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
44	UAW Local 412 - Unit 98 MCCSA Professionals	Hired on or before 12/31/2001 or vested by 2/26/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%

\* Must be vested on 12/31/2012, otherwise not eligible for DROP.

\*\* Minimum Age 50



## Section 5 – Summary of Plan Provisions (continued)

Benefit Provision Summary For Sheriff Employees									
Division Code	Division Name	Benefit Tier	Service Needed to Vest	DROP Eligible?	Retirement Eligibility (Age/Service)	Multiplier	Employer Maximum	FAC Period	Employee Contribution
1	COAM - Command	Hired before 11/1/1996	8 years	Yes*	60/8, 25 & out	2.4% / 1% (26 yrs)	66% of FAC	3 years	4%
		Hired on or after 11/1/1996 & before 6/1/2013	8 years	Yes*	60/8, 25 & out	2.64% for 25 yrs	66% of FAC	3 years	4%
		Hired on or after 6/1/2013 & before 12/31/2015	15 years	No	60/15, 25 & out	2.64% for 25 yrs	66% of FAC	3 years	4%
7	FOP Deputies	Hired before 6/1/2013	8 years	Yes*	60/8, 25 & out	2.64% for 25 yrs	66% of FAC	3 years	4%
		Hired on or after 6/1/2013 & before 12/31/2015	15 years	No	60/15, 25 & out	2.64% for 25 yrs	66% of FAC	3 years	4%
7	FOP Dispatchers	Hired before 6/1/2013	8 years	Yes*	60/8, 25 & out	2.64% for 25 yrs	66% of FAC	3 years	4%
		Hired on or after 6/1/2013 & before 12/31/2015	15 years	No	60/15, 25 & out	2.64% for 25 yrs	66% of FAC	3 years	4%
20	POLC Captains	Hired before 6/1/2013	8 years	Yes*	60/8, 25 & out	2.4% / 1% (26 yrs)	65% of FAC	3 years	4%
		Hired on or after 6/1/2013 & before 12/31/2015	15 years	No	60/15, 25 & out	2.4% / 1% (26 yrs)	65% of FAC	3 years	4%
26	MCPDSA Corrections Officers	Hired before 6/1/2013	8 years	Yes*	60/8, 25 & out	2.4% / 1% (26 yrs)	66% of FAC	3 years	4%
		Hired on or after 6/1/2013 & before 12/31/2015	15 years	No	60/15, 25 & out	2.4% / 1% (26 yrs)	66% of FAC	3 years	4%

\* Must be vested on 12/31/2012, otherwise not eligible for DROP.

Benefit Provision Summary For Road Commission Employees									
Division Code	Division Name	Benefit Tier	Service Needed to Vest	DROP Eligible?	Retirement Eligibility (Age/Service)	Multiplier	Employer Maximum	FAC Period	Employee Contribution
31	Road Non-Union	Hired on or before 7/31/2007 or vested by 1/29/2015	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 8/1/2007 & before 12/17/2013	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 12/17/2013 & before 12/31/2015	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
32	Road ADTECH	Hired on or before 7/31/2007 or vested by 1/29/2015	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 8/1/2007 & before 12/17/2013	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 12/17/2013 & before 12/31/2015	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
33	Road ROADTECH	Hired on or before 7/31/2007 or vested by 1/29/2015	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 8/1/2007 & before 6/1/2013	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 6/1/2013 & before 12/31/2015	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%

\* Must be vested on 12/31/2012, otherwise not eligible for DROP.

\*\* Minimum Age 50

## Section 5 – Summary of Plan Provisions (continued)

Benefit Provision Summary For Martha T. Berry Employees									
Division Code	Division Name	Benefit Tier	Service Needed to Vest	DROP Eligible?	Retirement Eligibility (Age/Service)	Multiplier	Employer Maximum	FAC Period	Employee Contribution
4	MNA (RNs at MTB)	Hired on or before 12/31/2001 or vested by 7/17/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012 & before 12/31/2015	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
5	Service Employees International Union (LPNs at MTB)	Hired on or before 12/31/2001 or vested by 7/17/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012 & before 12/31/2015	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
14	AFSCME 411 MTB	Hired on or before 12/31/2001 or vested by 6/26/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012 & before 12/31/2015	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
40	MTB Non Union Employees	Hired on or before 12/31/2001 or vested by 2/26/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012 & before 12/31/2015	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%
42	MTB UAW Supervisors	Hired on or before 12/31/2001 or vested by 6/26/2009	8 years	Yes*	60/8, Rule of 70**	2.4% / 1% (26 yrs)	65% of FAC	4 years	3.5%
		Hired on or after 1/1/2002 & before 1/1/2012	8 years	Yes*	55/25, 60/8	2.20%	66% of FAC	5 years	2.5%
		Hired on or after 1/1/2012 & before 12/31/2015	15 years	No	55/25, 60/15	2.20%	66% of FAC	5 years	2.5%

\* Must be vested on 12/31/2012, otherwise not eligible for DROP.

\*\* Minimum Age 50

### Participation in the Plan

The Retirement System is closed to new entrants, effective December 31, 2015.

### Lump Sum Termination Benefit

At termination, participants hired on or after January 1, 2016 and have 5 years of service are eligible for a \$1,000 lump sum payment.

### Death Benefit

No age or service requirements:

Refund of accumulated contributions.

10 or more years of service:

Computed as laid out in the Benefit Provision Summary but actuarially reduced in accordance with a 100% joint and survivor election.

### Disability Benefit

Computed as laid out in the Benefit Provision Summary with a minimum benefit of \$400 per month.

## Section 6 – ASOP 51 Disclosures

Funding future retirement benefits prior to when those benefits become due involves assumptions regarding future economic and demographic experience. These assumptions are applied to calculate actuarial liabilities, current contribution requirements and the funded status of the plan. However, to the extent future experience deviates from the assumptions used, variations will occur in these calculated values. These variations create risk to the plan. Understanding the risks to the funding of the plan is important. Therefore, a new Actuarial Standard of Practice (ASOP) has been adopted. Actuarial Standard of Practice No. 51 (“ASOP 51”) requires certain disclosures of potential risks to the plan and provides useful information for intended users of actuarial reports that determine plan contributions or evaluate the adequacy of specified contribution levels to support benefit provisions.

Under ASOP 51, risk is defined as the potential of actual future measurements deviating from expected future measurements resulting from actual future experience deviating from actuarially assumed experience.

It is important to note that not all risk is negative, but all risk should be understood and accepted based on knowledge, judgement and educated decisions. Future measurements may deviate in ways that produce positive or negative financial impacts to the plan.

In the actuary’s professional judgment, the following risks may reasonably be anticipated to significantly affect the plan’s future financial condition.

- Investment risk – potential that the investment return will be different than the 7.00% expected in the actuarial valuation
- Longevity risk – potential that participants live longer than expected from the valuation mortality assumptions
- Contribution risk – potential that the contribution will be different than the recommended contribution in the actuarial valuation

The following information is provided to comply with ASOP 51 and furnish beneficial information on potential risks to the plan. This list is not all-inclusive; it is an attempt to identify the most significant risks and how those risks might affect the results shown in this report.

## Section 6 – ASOP 51 Disclosures (continued)

Note that ASOP 51 does not require the actuary to evaluate the ability or willingness of the plan sponsor to make contributions to the plan when due, or to assess the likelihood or consequences of potential future changes in law. In addition, this valuation report is not intended to provide investment advice or to provide guidance on the management or reduction of risk. Buck welcomes the opportunity to assist in such matters as part of a separate project or projects utilizing the appropriate staff and resources for those objectives.

### Investment Risk

Plan costs are very sensitive to the market return. Any lower than assumed return on assets will increase costs:

- The lower market return will cause the market value of assets to be lower than expected.
- The plan uses an actuarial value of assets that smooths gains and losses on market returns over a five-year period to help control some of the volatility in costs due to investment risk.
- Past volatility of asset returns can be seen in Section 2.4 on page 17.

### Longevity Risk

Plan costs will be increased as participants are expected to live longer. This is because:

- Benefits are paid over a longer lifetime when life expectancy is expected to increase. The longer duration of payments leads to higher liabilities.
- Health care has been improving which increases the life expectancy of participants. As health care improves, costs to the plan will increase.
- The mortality assumption for the Plan does assume future improvement in mortality. Any improvement in future mortality greater than that expected by the current mortality assumption would lead to increased costs for the Plan.

### Contribution Risk

There is a risk associated with the employer's contribution when the actual amount and recommended amount differ. This is because:

- When the actual contribution is lower than the recommended contribution the Plan may not be sustainable in the long term.
- Any underpayment of the contribution will increase future contribution amounts to help pay off the additional Unfunded Actuarial Accrued Liability associated with any lower than recommended contribution amounts.

## Section 6 – ASOP 51 Disclosures (continued)

### Plan Maturity Measures:

There are certain measures that may aid in understanding the significant risks to the plan.

Ratio of Retired Liability to Total Liability	December 31, 2018	December 31, 2017
1. Retirees and Beneficiaries	598,252,717	575,505,683
2. Total Present Value of Future Benefits	1,139,594,415	1,163,097,466
3. Ratio [(1) / (2)]	52.5%	49.5%

A mature plan will often have a ratio above 60 - 65 percent. An increasing percentage may indicate a need for a less risky asset allocation which may lead to a lower long-term return on assets assumption and increased costs.

Ratio of Cash Flow to Assets	December 31, 2018	December 31, 2017
1. Contributions	26,999,720	25,124,450
2. Benefit Payments	66,297,751	65,895,203
3. Cash Flow [(1) – (2)]	(39,298,031)	(40,770,753)
4. Market Value of Assets	937,087,932	1,037,372,865
5. Ratio [(3) / (4)]	(4.19%)	(3.93%)

When this cash flow ratio is negative more cash is being paid out than deposited in the fund. Negative cash flow means the fund needs to rely on investment returns to cover benefit payments and at the same time may need to invest in more liquid assets to cover the benefit payments. More liquid assets may not garner the same returns as less liquid assets and therefore increase the investment risk. However, the low magnitude of the ratio implies there may already be enough liquid assets to cover the benefit payments, less investment return is needed to cover the shortfall, or only a small portion of assets will need to be converted to cash. Therefore, the investment risk is likely not amplified at this time. This maturity measure should be monitored for continual negative trend with greater magnitude.

## Section 6 – ASOP 51 Disclosures (continued)

Contribution Volatility	December 31, 2018	December 31, 2017
1. Market Value of Assets	937,087,932	1,037,372,865
2. Payroll	107,524,311	112,878,234
3. Asset Volatility Ratio (AVR) [(1) / (2)]	8.72	9.19
4. Accrued Liability	1,034,282,157	1,013,110,113
5. Liability Volatility Ratio (LVR) [(4) / (2)]	9.62	8.98

Plans that have higher asset-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) due to investment return. For example, a plan with an asset-to-payroll ratio of 10 may experience twice the contribution volatility due to investment return volatility than a plan with an asset-to-payroll ratio of 5. Plans that have higher liability-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) due to changes in liability. For example, if an assumption change increases the liability of two plans by the same percent the plan with a liability-to-payroll ratio of 10 may experience twice the contribution volatility than a plan with a liability-to-payroll ratio of 5.

# Glossary

## **Actuarial Accrued Liability**

Total accumulated cost to fund pension benefits arising from service in all prior years.

## **Actuarial Cost Method**

Technique used to assign or allocate, in a systematic and consistent manner, the expected cost of a pension plan for a group of plan members to the years of service that give rise to that cost.

## **Actuarial Present Value of Future Benefits**

Amount which, together with future interest, is expected to be sufficient to pay all future benefits.

## **Actuarial Valuation**

Study of probable amounts of future pension benefits and the necessary amount of contributions to fund those benefits.

## **Actuary**

Person who performs mathematical calculations pertaining to pension and insurance benefits based on specific procedures and assumptions.

## **GASB 67**

Governmental Accounting Standards Board Statement Number 67.

## **Maturity Ratio**

The ratio of the actuarial accrued liability for members who are no longer active to the total actuarial accrued liability. A ratio of over 50% indicates a mature plan. The higher the maturity ratio, the more volatile the contribution rate will be from year to year given actuarial gains and losses.

## **Normal Cost**

That portion of the actuarial present value of benefits assigned to a particular year in respect to an individual participant or the plan as a whole.

## **Unfunded Actuarial Accrued Liability (UAAL)**

The portion of the actuarial accrued liability not offset by plan assets.