Municipal Employees' Retirement System of Michigan

Annual Actuarial Valuation Report
December 31, 2018 - Antrim Co (0502)

GRS Retirement Consulting

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Spring, 2019

Antrim Co

In care of:
Municipal Employees' Retirement System of Michigan
1134 Municipal Way
Lansing, Michigan 48917

This report presents the results of the Annual Actuarial Valuation, prepared for Antrim Co (0502) as of December 31, 2018. The report includes the determination of liabilities and contribution rates resulting from the participation in the Municipal Employees' Retirement System of Michigan ("MERS"). This report contains the minimum actuarially determined contribution requirement, in alignment with the MERS Plan Document, Actuarial Policy, and the Michigan Constitution and governing statutes. Antrim Co is responsible for the employer contributions needed to provide MERS benefits for its employees and former employees.

The purposes of this valuation are to:

- Measure funding progress as of December 31, 2018,
- Establish contribution requirements for the fiscal year beginning January 1, 2020,
- Provide information regarding the identification and assessment of risk,
- Provide actuarial information in connection with applicable Governmental Accounting Standards Board (GASB) statements, and
- Provide information to assist the local unit of government with state reporting requirements.

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 findings in this report are based on data and other information through December 31, 2018. The valuation was based upon information furnished by MERS 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 data. We are not responsible for the accuracy or completeness of the information provided by MERS.

The Municipal Employees' Retirement Act, PA 427 of 1984 and the MERS' Plan Document Article VI sec. 71 (1)(d), provides the MERS Board with the authority to set actuarial assumptions and methods after consultation with the actuary. As the fiduciary of the plan, MERS Retirement Board sets certain assumptions for funding and GASB purposes. These assumptions are checked regularly through a comprehensive study, called an Experience Study. The most recent study was completed in 2015, as prepared by the prior actuary, and is the basis of the assumptions and methods currently in place. **At the February 28, 2019 board meeting, the MERS Retirement Board adopted new economic assumptions effective with the December 31, 2019 annual actuarial valuation, which will impact contributions beginning in 2021.** An illustration of the potential impact is found in this report.

The Michigan Department of Treasury provides required assumptions to be used for purposes of Public Act 202 reporting. These assumptions are for reporting purposes only and do not impact required contributions. Please refer to the State Reporting page found at the end of this report for information for this filing.

For a full list of all the assumptions used, please refer to the division-specific assumptions described in table(s) in this report, and to the Appendix on the MERS website at: http://www.mersofmich.com/Portals/0/Assets/Resources/AAV-Appendix/MERS-2018AnnualActuarialValuation-Appendix.pdf.

The actuarial assumptions used for this valuation are reasonable for purposes of the measurement.

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 Antrim Co as of the valuation date. All calculations have been made in conformity with generally accepted actuarial principles and practices, with the Actuarial Standards of Practice issued by the Actuarial Standards Board, and with applicable statutes.

David T. Kausch, Rebecca L. Stouffer, and Mark Buis are members of the American Academy of Actuaries. These actuaries meet the Academy's Qualification Standards to render the actuarial opinions contained herein. The signing actuaries are independent of the plan sponsor. GRS maintains independent consulting agreements with certain local units of government for services unrelated to the actuarial consulting services provided in this report.

The Retirement Board of the Municipal Employees' Retirement System of Michigan confirms that the System provides for payment of the required employer contribution as described in Section 20m of Act No. 314 of 1965 (MCL 38.1140m).

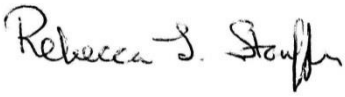
This information is purely actuarial in nature. It is not intended to serve as a substitute for legal, accounting or investment advice.

This report was prepared at the request of the MERS Retirement Board and may be provided only in its entirety by the municipality to other interested parties (MERS customarily provides the full report on request to associated third parties such as the auditor for the municipality). GRS is not responsible for the consequences of any unauthorized use. 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.

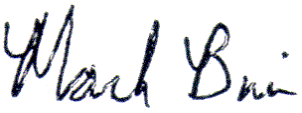
If you have reason to believe that the plan provisions are incorrectly described, that important plan provisions relevant to this valuation are not described, that conditions have changed since the calculations were made, that the information provided in this report is inaccurate or is in anyway incomplete, or if you need further information in order to make an informed decision on the subject matter in this report, please contact your Regional Manager at 1.800.767.MERS (6377).

Sincerely,

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



Rebecca L. Stouffer, ASA, FCA, MAAA



Mark Buis, FSA, FCA, EA, MAAA

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Executive Summary

Funded Ratio

The funded ratio of a plan is the percentage of the dollar value of the actuarial accrued liability that is covered by the actuarial value of assets. While funding ratio may be a useful plan measurement, understanding a plan's funding trend may be more important than a particular point in time. Refer to Table 7 to find a history of this information.

	12/31/2018	12/31/2017
Funded Ratio*	75%	75%

* Reflects assets from Surplus divisions, if any.

There has been a change in actuary and actuarial software since the December 31, 2017 valuation. Throughout this report are references to valuation results generated prior to the 2018 valuation date. Results prior to 2018 were received directly from the prior actuary or extracted from the previous valuation system by MERS's technology service provider.

Required Employer Contributions:

Your required employer contributions are shown in the following table. Employee contributions, if any, are in addition to the employer contributions. Changes to the actuarial assumptions and methods based on the 2015 Experience Study are phased-in over a 5-year period. This valuation reflects the fourth year of the phase-in.

Your minimum required contribution is the amount in the "Phase-in" columns. By default, MERS will invoice you the phased-in contribution amount, but strongly encourages you to contribute more than the minimum required contribution. If you requested and have been billed using No Phase-in rates, your 2019 rates will continue to use the No Phase-in method. If you have been billed using the Phased-in rates and wish to change to rates based on No Phase-in, please contact MERS.

	Percentage of Payroll				Monthly $ Based on Projected Payroll			
	Phase-in	No Phase-in	Phase-in	No Phase-in	Phase-in	No Phase-in	Phase-in	No Phase-in
Valuation Date:	12/31/2018	12/31/2018	12/31/2017	12/31/2017	12/31/2018	12/31/2018	12/31/2017	12/31/2017
Fiscal Year Beginning:	January 1, 2020	January 1, 2020	January 1, 2019	January 1, 2019	January 1, 2020	January 1, 2020	January 1, 2019	January 1, 2019
Division								
01 - General	-	-	-	-	$ 44,543	$ 45,761	$ 40,298	$ 42,734
04 - MCF	-	-	-	-	59,986	61,415	55,165	58,023
10 - Gnrl Dial a Ride	-	-	-	-	4,353	4,468	3,861	4,091
20 - Sheriff Dept	-	-	-	-	30,189	31,022	31,139	32,805
HA - Shrf&Grnldal 1/14 &Gnrl 1/15	5.94%	5.96%	5.50%	5.56%	10,918	10,963	8,184	8,274
Municipality Total					**$ 149,989**	**$ 153,629**	**$ 138,647**	**$ 145,927**

Employee contribution rates:

	Employee Contribution Rate			
	Phase-in	No Phase-in	Phase-in	No Phase-in
Valuation Date:	12/31/2018	12/31/2018	12/31/2017	12/31/2017
Fiscal Year Beginning:	January 1, 2020	January 1, 2020	January 1, 2019	January 1, 2019
Division				
01 - General	0.00%	0.00%	0.00%	0.00%
04 - MCF	2.00%	2.00%	2.00%	2.00%
10 - Gnrl Dial a Ride	0.00%	0.00%	0.00%	0.00%
20 - Sheriff Dept	0.00%	0.00%	0.00%	0.00%
HA - Shrf&Grnldal 1/14 &Gnrl 1/15	0.00%	0.00%	0.00%	0.00%

Allocation of the phase-in contributions between the employer and members was completed by the prior actuary, based on information provided by MERS. This report reflects one additional year of the remaining phase-in. The actuaries assume no responsibility if the allocation method conflicts with any particular employer cap agreement.

The employer may contribute more than the minimum required contributions, as these additional contributions will earn investment income and may result in lower future contribution requirements. Employers making contributions in excess of the minimum requirements may elect to apply the excess contribution immediately to a particular division, or segregate the excess into one or more of what MERS calls "Surplus" divisions. An election in the first case would immediately reduce any unfunded accrued liability and lower the amortization payments throughout the remaining amortization period. An election to set up Surplus divisions would not immediately lower future contributions, however the assets from the Surplus division could be transferred to an unfunded division in the future to reduce the unfunded liability in future years, or to be used to pay all or a portion of the minimum required contribution in a future year. For purposes of this report, the assets in any Surplus division have been included in the municipality's total assets, unfunded accrued liability and funded status, however, these assets are not used in calculating the minimum required contribution.

MERS strongly encourages employers to contribute more than the minimum contribution shown above.

Assuming that experience of the plan meets actuarial assumptions:

• To accelerate to a 100% funding ratio in 10 years, estimated monthly employer contributions for the fiscal year beginning in 2020 for the entire employer would be $202,433, instead of $153,629.

How and Why Do These Numbers Change?

In a defined benefit plan contributions vary from one annual actuarial valuation to the next as a result of the following:

- Changes in benefit provisions (see Table 2)
- Changes in actuarial assumptions and methods (see the Appendix)
- Experience of the plan (investment experience and demographic experience); this is the difference between actual experience of the plan and the actuarial assumptions.

Comments on Investment Rate of Return Assumption

A defined benefit plan is funded by employer contributions, participant contributions, and investment earnings. Investment earnings have historically provided **more than half** of the funding. The larger the share of benefits being provided from investment returns, the smaller the required contributions, and vice versa. Determining the contributions required to prefund the promised retirement benefits requires an assumption of what investment earnings are expected to add to the fund over a long period of time. This is called the **Investment Return Assumption**.

The MERS Investment Return Assumption is **7.75%** per year. This, along with all of our other actuarial assumptions, is reviewed at least every five years in an Experience Study that compares the assumptions used against actual experience and recommends adjustments if necessary. If your municipality would like to explore contributions at lower assumed investment return assumptions, please review the "what if" projection scenarios later in this report.

Assumption Change in 2019

At the February 28, 2019 board meeting, the MERS Retirement Board adjusted key economic assumptions. These assumptions, in particular the investment return assumption, have a significant effect on a plan's required contribution and funding level. Historically low interest rates, along with high equity market valuations, have led to reductions in projected returns for most asset classes. This has resulted in a Board adopted reduction in the investment rate of return assumption to 7.35%, effective with the December 31, 2019 valuation first impacting 2021 contributions. The Board also changed the assumed rate of wage inflation from 3.75% to 3.00%, with the same effective date. This report includes a "What If" scenario of 7.35%/3.00% in order to show the potential impact of this assumption change.

Comments on Asset Smoothing

To avoid dramatic spikes and dips in annual contribution requirements due to short term fluctuations in asset markets, MERS applies a technique called **asset smoothing**. This spreads out each year's investment gains or losses over the prior year and the following four years. This smoothing method is used to determine your actuarial value of assets (valuation assets), which is then used to determine both your funded ratio and your required contributions. The (smoothed) **actuarial rate of return for 2018 was 3.80%, while the actual market rate of return was (4.12)%.** To see historical details of the market rate of return, compared to the smoothed actuarial rate of return, refer to this report's Appendix, or view the "How Smoothing Works" video on the Defined Benefit resource page of the MERS website.

As of December 31, 2018 the actuarial value of assets is 110% of market value due to asset smoothing. This means that meeting the actuarial assumption in the next few years will require average annual market returns that exceed the 7.75% investment return assumption, or contribution requirements will continue to increase.

If the December 31, 2018 valuation results were based on market value instead of actuarial value:

- The funded percent of your entire municipality would be 68% (instead of 75%); and
- Your total employer contribution requirement for the fiscal year starting January 1, 2020 would be $2,108,316 (instead of $1,843,548)

Alternate Scenarios to Estimate the Potential Volatility of Results ("What If Scenarios")

The calculations in this report are based on assumptions about long-term economic and demographic behavior. These assumptions will never materialize in a given year, except by coincidence. Therefore the results will vary from one year to the next. The volatility of the results depends upon the characteristics of the plan. For example:

- Open divisions that have substantial assets compared to their active employee payroll will have more volatile employer contribution rates due to investment return fluctuations.
- Open divisions that have substantial accrued liability compared to their active employee payroll will have more volatile employer contribution rates due to demographic experience fluctuations.
- Small divisions will have more volatile contribution patterns than larger divisions because statistical fluctuations are relatively larger among small populations.
- Shorter amortization periods result in more volatile contribution patterns.

Many assumptions are important in determining the required employer contributions. In the following table, we show the impact of varying the Investment Return assumption and the Wage Inflation assumption. Lower investment returns would result in higher required employer contributions, and vice-versa. Lower wage inflation generally results in lower required employer contributions as a dollar amount in the long run, and vice versa.

The relative impact of each economic scenario below will vary from year to year, as the participant demographics change. The impact of each scenario should be analyzed for a given year, not from year to year. The results in the table are based on the December 31, 2018 valuation, and are for the municipality in total, not by division. These results do not reflect a 5-year phase in of the impact of the new actuarial assumptions.

It is important to note that calculations in this report are mathematical estimates based upon assumptions regarding future events, which may or may not materialize. Actuarial calculations can and do vary from one valuation to the next, sometimes significantly depending on the group's size. Projections are not predictions. Future valuations will be based on actual future experience.

The Retirement Board has adopted a change to the Investment Return Assumption from 7.75% to 7.35%, and the wage inflation from 3.75% to 3.00%. This change will be effective in the December 31, 2019 valuation which will impact the Fiscal Year 2021 contribution. The scenario shown using these assumptions as of December 31, 2018 is illustrative only. The actual impact of this change when reflected in the 2019 valuation will be different.

	Assumed Future Annual Smoothed Rate of Investment Return		
12/31/2018 Valuation Results	**Lower Future Annual Returns**	**Adopted 2019 Assumption**	**Valuation Assumptions**
Investment Return Assumption	**5.75%**	**7.35%**	**7.75%**
Wage Increase Assumption	**3.75%**	**3.00%**	**3.75%**
Accrued Liability	$ 61,917,313	$ 50,689,431	$ 49,251,721
Valuation Assets[1]	$ 36,760,104	$ 36,760,104	$ 36,760,104
Unfunded Accrued Liability	$ 25,157,209	$ 13,929,327	$ 12,491,617
Funded Ratio	59%	73%	75%
Monthly Normal Cost	$ 118,806	$ 70,100	$ 70,750
Monthly Amortization Payment	$ 143,859	$ 94,765	$ 82,879
Total Employer Contribution[2]	$ 262,665	$ 164,865	$ 153,629

[1] The Valuation Assets include assets from Surplus divisions, if any.

[2] If assets exceed accrued liabilities for a division, the division may have an overfunding credit to reduce the division's employer contribution requirement. If the overfunding credit is larger than the normal cost, the division's full credit is included in the municipality's amortization payment above but the division's total contribution requirement is zero. This can cause the displayed normal cost and amortization payment to not add up to the displayed total employer contribution.

Note:

The above total employer contributions for the 5.75%/3.75% and 7.35%/3.00% scenarios do not reflect the changes in the employee contribution rates due to the impact of a cap, if any, on employer contributions. Those scenarios are based on the same employee contribution rates as the 7.75% scenario.

Projection Scenarios

The next two pages show projections of the plan's funded ratio and computed employer contributions under the actuarial assumptions used in the valuation and alternate economic scenarios. All three projections take into account the past investment losses that will continue to affect the actuarial rate of return in the short term.

The 7.75%/3.75% scenario provides an estimate of computed employer contributions based on current actuarial assumptions, and a projected 7.75% market return. The other two scenarios may be useful if the municipality chooses to budget more conservatively, and make contributions in addition to the minimum requirements. The 7.35%/3.00% and 5.75%/3.75% projections provide an indication of the potential required employer contribution if these assumptions were met over the long-term.

Your municipality includes one or more Surplus divisions. The assets in a Surplus division may be used to reduce future employer contributions or to accelerate the date by which the municipality becomes 100% funded. The timing and use of these Surplus assets is discretionary.

The Funded Percentage graph shows projections of funded status under the 7.75% investment return assumption, both including the Surplus assets (contributed as of the valuation date), and without the Surplus assets. The graph including the Surplus assets assumes these Surplus assets grow with interest and are not used to lower future employer contributions. We modeled the projections including the Surplus assets in this fashion because the use of these assets is discretionary by the employer and we do not know when and how the employer will use them. Once the employer uses these Surplus assets, any future employer contributions are expected to be lower than those shown in the projections.

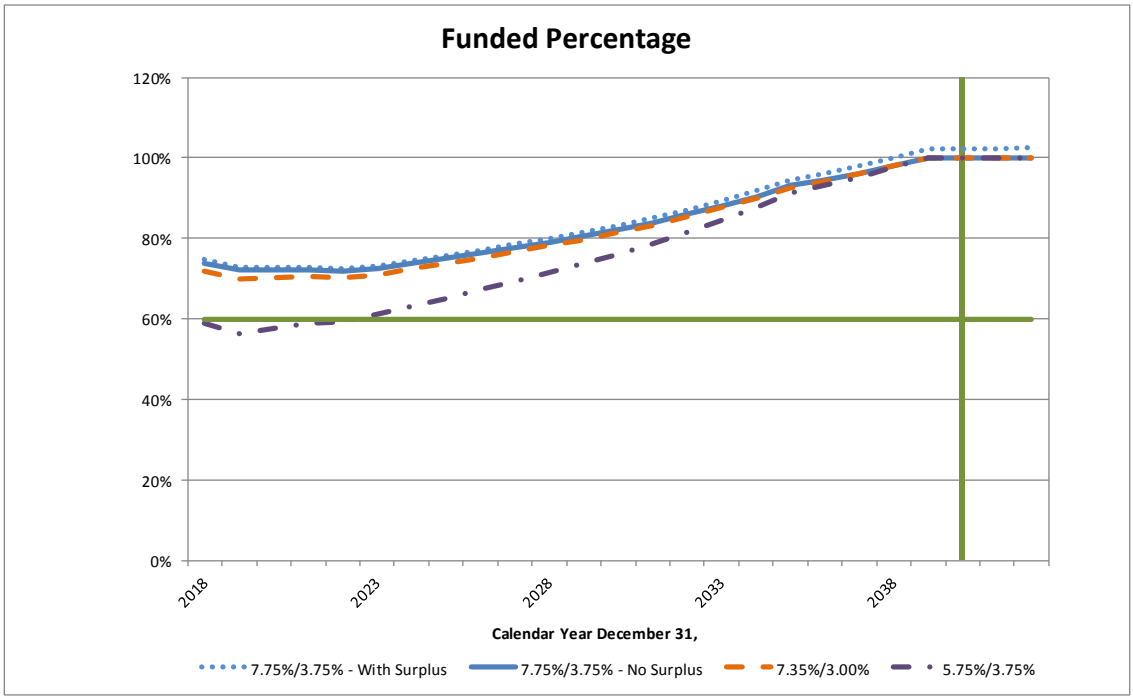
Valuation Year Ending 12/31	Fiscal Year Beginning 1/1	Actuarial Accrued Liability	Valuation Assets[2]	Funded Percentage	Computed Annual Employer Contribution
7.75%[1]/3.75%					
NO 5-YEAR PHASE-IN					
2018	2020	$ 49,251,721	$ 36,413,929	74%	$ 1,843,548
2019	2021	$ 51,600,000	$ 37,200,000	72%	$ 2,000,000
2020	2022	$ 53,900,000	$ 38,900,000	72%	$ 2,070,000
2021	2023	$ 56,100,000	$ 40,500,000	72%	$ 2,170,000
2022	2024	$ 58,200,000	$ 41,700,000	72%	$ 2,300,000
2023	2025	$ 60,100,000	$ 43,500,000	72%	$ 2,370,000
7.35%[1]/3.00%					
NO 5-YEAR PHASE-IN					
2018	2020	$ 50,689,431	$ 36,413,929	72%	$ 1,978,380
2019	2021	$ 53,000,000	$ 37,000,000	70%	$ 2,130,000
2020	2022	$ 55,200,000	$ 38,800,000	70%	$ 2,200,000
2021	2023	$ 57,200,000	$ 40,300,000	70%	$ 2,290,000
2022	2024	$ 59,100,000	$ 41,500,000	70%	$ 2,410,000
2023	2025	$ 60,900,000	$ 43,200,000	71%	$ 2,470,000
5.75%[1]/3.75%					
NO 5-YEAR PHASE-IN					
2018	2020	$ 61,917,313	$ 36,413,929	59%	$ 3,151,980
2019	2021	$ 64,600,000	$ 36,400,000	56%	$ 3,350,000
2020	2022	$ 67,300,000	$ 38,900,000	58%	$ 3,430,000
2021	2023	$ 69,800,000	$ 41,100,000	59%	$ 3,540,000
2022	2024	$ 72,100,000	$ 42,700,000	59%	$ 3,710,000
2023	2025	$ 74,300,000	$ 45,400,000	61%	$ 3,770,000

[1] Represents both the interest rate for discounting liabilities and the future investment return assumption on the Market Value of assets.

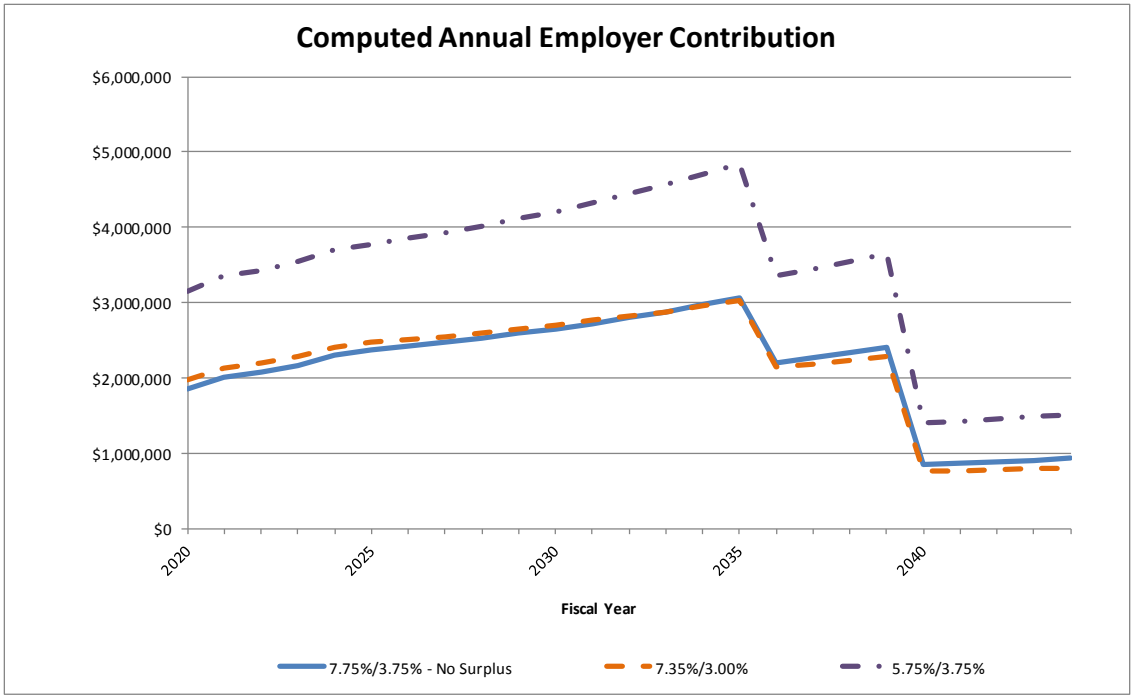
[2] Valuation Assets do not include assets from Surplus divisions, if any.

Note:

The above required annual employer contribution does not reflect future changes in the employee contribution rates due to the impact of a cap, if any, on employer contributions.



Notes:
All projected funded percentages are shown with no phase-in.
Assumes assets from Surplus divisions will not be used to lower employer contributions during the projection period.
The green indicator lines have been added at 60% funded and 22 years following the valuation date for PA 202 purposes.



Notes:
All projected contributions are shown with no phase-in.
Projected employer contributions do not reflect the use of any assets from the Surplus divisions.
The above required annual employer contribution does not reflect future changes in the employee contribution rates due to the impact of a cap, if any, on employer contributions.

Table 1: Employer Contribution Details For the Fiscal Year Beginning January 1, 2020

Division	Total Normal Cost	Employee Contribut. Rate	Employer Contributions[1]			Computed Employer Contribut. With Phase-In	Blended ER Rate No Phase-In[5]	Blended ER Rate With Phase-In[5]	Employee Contribut. Conversion Factor[2]
			Employer Normal Cost	Payment of the Unfunded Accrued Liability[4]	Computed Employer Contribut. No Phase-In				
Percentage of Payroll									
01 - General	9.72%	0.00%	-	-	-	-	18.56%	18.11%	
04 - MCF	6.81%	2.00%	-	-	-	-			
10 - Gnrl Dial a Ride	10.84%	0.00%	-	-	-	-	18.56%	18.11%	
20 - Sheriff Dept	10.34%	0.00%	-	-	-	-	18.56%	18.11%	
HA - Shrf&Grnldal 1/14 &Gnrl 1/15	5.82%	0.00%	5.82%	0.14%	5.96%	5.94%	18.56%	18.11%	0.88%
Estimated Monthly Contribution[3]									
01 - General			$ 15,996	$ 29,765	$ 45,761	$ 44,543			
04 - MCF			28,669	32,746	61,415	59,986			
10 - Gnrl Dial a Ride			948	3,520	4,468	4,353			
20 - Sheriff Dept			14,423	16,599	31,022	30,189			
HA - Shrf&Grnldal 1/14 &Gnrl 1/15			10,714	249	10,963	10,918			
Total Municipality			**$ 70,750**	**$ 82,879**	**$ 153,629**	**$ 149,989**			
Estimated Annual Contribution[3]			**$ 849,000**	**$ 994,548**	**$ 1,843,548**	**$ 1,799,868**			

1 The above employer contribution requirements are in addition to the employee contributions, if any.

2 If employee contributions are increased/decreased by 1.00% of pay, the employer contribution requirement will decrease/increase by the Employee Contribution Conversion Factor. The conversion factor is usually under 1%, because employee contributions may be refunded at termination of employment, and not used to fund retirement pensions. Employer contributions will all be used to fund pensions.

3 For divisions that are open to new hires, estimated contributions are based on projected fiscal year payroll. Actual contributions will be based on actual reported monthly pays, and will be different from the above amounts. For divisions that will have no new hires (i.e., closed divisions), invoices will be based on the above dollar amounts which are based on projected fiscal year payroll. See description of Open Divisions and Closed Divisions in the Appendix.

4 Note that if the overfunding credit is larger than the normal cost, the full credit is shown above but the total contribution requirement is zero. This will cause the displayed normal cost and unfunded accrued liability contributions to not add across.

5 For linked divisions, the employer will be invoiced the Computed Employer Contribution with Phase-in rate shown above for each linked division (a contribution rate for the open division; a contribution dollar for the closed-but-linked division), unless the employer elects to contribute the Blended Employer Contribution rate shown above, by contacting MERS at 800-767-MERS (6377).

Note that employer contribution caps are in effect for Division(s): HA. For these divisions the employee contribution rates in Table 1 do not reflect

phase-in over 5 fiscal years (beginning in 2017) of the increased employee contribution requirements associated with the new actuarial assumptions. The full employee contribution rate without phase-in is shown in Table 1 above. The contribution requirements including the 5-year phase-in are shown on page 2.

Please see the Comments on Asset Smoothing in the Executive Summary of this report.

Table 2: Benefit Provisions

01 - General: Closed to new hires, linked to Division HA

	2018 Valuation	2017 Valuation
Benefit Multiplier:	2.50% Multiplier (80% max)	2.50% Multiplier (80% max)
Normal Retirement Age:	60	60
Vesting:	10 years	10 years
Early Retirement (Unreduced):	-	-
Early Retirement (Reduced):	50/25	50/25
	55/15	55/15
Final Average Compensation:	5 years	5 years
COLA for Current Retirees:	2.50% (Non-Compound)	2.50% (Non-Compound)
Employee Contributions:	0.00%	0.00%
Act 88:	Yes (Adopted 11/25/1970)	Yes (Adopted 11/25/1970)

04 - MCF: Closed to new hires

	2018 Valuation	2017 Valuation
Benefit Multiplier:	Svc x [1.20% x FAC<$4,200, plus 1.70% x FAC>$4,200] (no max)	Svc x (1.20% times FAC<$4,200, plus 1.70% times FAC>$4,200)
Normal Retirement Age:	60	60
Vesting:	10 years	10 years
Early Retirement (Unreduced):	-	-
Early Retirement (Reduced):	50/25	50/25
	55/15	55/15
Final Average Compensation:	5 years	5 years
COLA for Current Retirees:	2.50% (Non-Compound)	2.50% (Non-Compound)
Employee Contributions:	2.00%	2.00%
DC Plan for New Hires:	1/1/2017	1/1/2017
Act 88:	Yes (Adopted 11/25/1970)	Yes (Adopted 11/25/1970)

10 - Gnrl Dial a Ride: Closed to new hires, linked to Division HA

	2018 Valuation	2017 Valuation
Benefit Multiplier:	2.50% Multiplier (80% max)	2.50% Multiplier (80% max)
Normal Retirement Age:	60	60
Vesting:	10 years	10 years
Early Retirement (Unreduced):	-	-
Early Retirement (Reduced):	50/25	50/25
	55/15	55/15
Final Average Compensation:	5 years	5 years
COLA for Current Retirees:	2.50% (Non-Compound)	2.50% (Non-Compound)
Employee Contributions:	0.00%	0.00%
Act 88:	Yes (Adopted 11/25/1970)	Yes (Adopted 11/25/1970)

20 - Sheriff Dept: Closed to new hires, linked to Division HA

	2018 Valuation	2017 Valuation
Benefit Multiplier:	2.50% Multiplier (80% max)	2.50% Multiplier (80% max)
Normal Retirement Age:	60	60
Vesting:	10 years	10 years
Early Retirement (Unreduced):	55/20	55/20
Early Retirement (Reduced):	50/25	50/25
	55/15	55/15
Final Average Compensation:	5 years	5 years
Employee Contributions:	0.00%	0.00%
Act 88:	Yes (Adopted 11/25/1970)	Yes (Adopted 11/25/1970)

HA - Shrf&Grnldal 1/14 &Gnrl 1/15: Open Division, linked to Division 01, 10, 20

	2018 Valuation	2017 Valuation
Benefit Multiplier:	1.25% Multiplier (no max)	Hybrid Plan - 1.25% Multiplier
Normal Retirement Age:	60	60
Vesting:	6 years	6 years
Early Retirement (Unreduced):	-	-
Early Retirement (Reduced):	-	-
Final Average Compensation:	3 years	3 years
Employee Contributions:	0.00%	0.00%
Act 88:	Yes (Adopted 11/25/1970)	Yes (Adopted 11/25/1970)

Note that employer contribution caps are in effect for Division(s): HA. For these divisions the employee contribution rates in Table 2 do not reflect phase-in over 5 fiscal years of the increased employee contribution requirements associated with the new actuarial assumptions. The full employee contribution rate without phase-in is shown in Table 2 above. The contribution requirements including the 5-year phase-in are shown on page 2.

Table 3: Participant Summary

Division	2018 Valuation Number	2018 Valuation Annual Payroll[1]	2017 Valuation Number	2017 Valuation Annual Payroll[1]	2018 Valuation Average Age	2018 Valuation Average Benefit Service[2]	2018 Valuation Average Eligibility Service[2]
01 - General							
Active Employees	49	$ 2,163,549	55	$ 2,341,820	55.2	15.4	15.6
Vested Former Employees	18	150,163	18	155,321	54.6	11.2	16.3
Retirees and Beneficiaries	79	859,396	73	725,991	72.4		
04 - MCF							
Active Employees	146	$ 7,436,981	164	$ 7,867,393	46.0	11.2	11.8
Vested Former Employees	34	223,187	32	208,236	53.9	12.0	14.2
Retirees and Beneficiaries	89	817,238	88	791,587	71.3		
10 - Gnrl Dial a Ride							
Active Employees	4	$ 130,430	4	$ 126,854	60.2	15.0	15.0
Vested Former Employees	2	7,354	1	5,173	51.7	8.9	8.9
Retirees and Beneficiaries	10	96,234	10	96,233	72.0		
20 - Sheriff Dept							
Active Employees	34	$ 1,811,370	38	$ 1,957,544	50.2	18.3	18.5
Vested Former Employees	15	175,405	16	186,891	48.1	10.0	16.8
Retirees and Beneficiaries	22	362,812	21	356,290	69.9		
HA - Shrf&Grnldal 1/14 &Gnrl 1/15							
Active Employees	40	$ 1,434,139	32	$ 1,002,525	43.1	2.0	3.6
Vested Former Employees	1	163	1	163	68.5	1.8	35.6
Retirees and Beneficiaries	0	0	0	0	0.0		
Total Municipality							
Active Employees	**273**	**$ 12,976,469**	**293**	**$ 13,296,136**	**48.0**	**11.5**	**12.2**
Vested Former Employees	**70**	**556,272**	**68**	**555,784**	**53.0**	**11.1**	**15.5**
Retirees and Beneficiaries	**200**	**2,135,680**	**192**	**1,970,101**	**71.6**		
Total Participants	**543**		**553**				

1 Annual payroll for active employees; annual deferred benefits payable for vested former employees; annual benefits being paid for retirees and beneficiaries.

2 Descriptions can be found under Miscellaneous and Technical Assumptions in the Appendix.

Table 4: Reported Assets (Market Value)

Division	2018 Valuation		2017 Valuation	
	Employer and Retiree[1]	Employee[2]	Employer and Retiree[1]	Employee[2]
01 - General	$ 10,278,795	$ 43,125	$ 10,980,171	$ 78,677
04 - MCF	11,855,509	1,535,269	12,603,314	1,413,418
10 - Gnrl Dial a Ride	776,557	0	866,678	0
20 - Sheriff Dept	8,544,550	21,332	8,897,550	30,372
HA - Shrf&Grnldal 1/14 &Gnrl 1/15	189,211	0	126,267	0
S1 - Surplus assoc div 01	276,895	0	0	0
S2 - Surplus assoc div 10	39,147	0	0	0
Municipality Total[3]	**$ 31,960,664**	**$ 1,599,726**	**$ 33,473,980**	**$ 1,522,467**
Combined Assets[3]	**$33,560,390**		**$34,996,447**	

[1] Reserve for Employer Contributions and Benefit Payments.

[2] Reserve for Employee Contributions.

[3] Totals may not add due to rounding.

The December 31, 2018 valuation assets (actuarial value of assets) are equal to 1.095342 times the reported market value of assets (compared to 1.011321 as of December 31, 2017). Refer to the Appendix for a description of the valuation asset derivation and a detailed calculation of valuation assets.

Assets in the Surplus division(s) are employer assets that have been reserved to be used by the employer at some point in the future to stabilize increases in contributions. These assets are not used in calculating the employer contribution for the fiscal year beginning January 1, 2020.

Table 5: Flow of Valuation Assets

Year Ended 12/31	Employer Contributions		Employee Contributions	Investment Income (Valuation Assets)	Benefit Payments	Employee Contribution Refunds	Net Transfers	Valuation Asset Balance
	Required	Additional						
2008	$ 1,019,068		$ 118,746	$ 1,027,132	$ (1,006,129)	$ (46,416)	$ 7,860	$ 22,548,676
2009	1,059,524		116,103	1,215,093	(1,061,811)	(48,707)	212	23,829,090
2010	1,045,531		117,543	1,407,484	(1,160,900)	(34,216)	0	25,204,532
2011	1,018,515	$ 30,024	119,768	1,372,445	(1,281,451)	(34,825)	(235)	26,428,773
2012	1,069,001	26,922	128,115	1,290,292	(1,343,486)	(23,909)	0	27,575,708
2013	1,098,613	39,747	138,276	1,706,963	(1,447,763)	(21,220)	0	29,090,324
2014	1,211,040	25,228	154,645	1,701,821	(1,582,536)	(55,904)	0	30,544,618
2015	1,334,595	56,527	170,989	1,584,866	(1,723,037)	(43,335)	60,158	31,985,381
2016	1,381,281	107,901	172,627	1,736,993	(1,842,178)	(30,367)	0	33,511,638
2017	1,527,990	21,960	165,385	2,067,076	(1,915,230)	(23,693)	37,515	35,392,641
2018	1,634,011	331,000	155,443	1,341,342	(2,046,973)	(47,360)	0	36,760,104

Notes:

Transfers in and out are usually related to the transfer of participants between municipalities, and to employer and employee payments for service credit purchases (if any) that the governing body has approved.

Additional employer contributions, if any, are shown separately starting in 2011. Prior to 2011, additional contributions are combined with the required employer contributions.

The investment income column reflects the recognized investment income based on Valuation Assets. It does not reflect the market value investment return in any given year.

The Valuation Asset balance includes assets from Surplus divisions, if any.

Years where historical information is not available, will be displayed with zero values.

Table 6: Actuarial Accrued Liabilities and Valuation Assets as of December 31, 2018

Division	Actuarial Accrued Liability					Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
	Active Employees	Vested Former Employees	Retirees and Beneficiaries	Pending Refunds	Total			
01 - General	$ 7,470,845	$ 975,562	$ 7,724,640	$ 787	$ 16,171,834	$ 11,306,032	69.9%	$ 4,865,802
04 - MCF	10,388,504	1,777,255	7,018,494	98,644	19,282,897	14,667,481	76.1%	4,615,416
10 - Gnrl Dial a Ride	440,690	50,074	935,795	0	1,426,559	850,595	59.6%	575,964
20 - Sheriff Dept	7,308,712	1,266,599	3,548,570	0	12,123,881	9,382,570	77.4%	2,741,311
HA - Shrf&Grnldal 1/14 &Gnrl 1/15	245,048	1,502	0	0	246,550	207,251	84.1%	39,299
S1 - Surplus assoc div 01	0	0	0	0	0	303,295		(303,295)
S2 - Surplus assoc div 10	0	0	0	0	0	42,880		(42,880)
Total	**$ 25,853,799**	**$ 4,070,992**	**$ 19,227,499**	**$ 99,431**	**$ 49,251,721**	**$ 36,760,104**	**74.6%**	**$ 12,491,617**

The following results show the combined accrued liabilities and assets for each set of linked divisions. These results are already shown in the table on the prior page(s).

Table 6 (continued)

Division	Actuarial Accrued Liability					Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
	Active Employees	Vested Former Employees	Retirees and Beneficiaries	Pending Refunds	Total			
Linked Divisions HA, 01, 10, 20	$ 15,465,295	$ 2,293,737	$12,209,005	$ 787	$ 29,968,824	$ 21,746,448	72.6%	$ 8,222,376

Please see the Comments on Asset Smoothing in the Executive Summary of this report.

Table 7: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2004	$ 20,010,026	$ 16,568,156	83%	$ 3,441,870
2005	21,688,579	17,942,859	83%	3,745,720
2006	23,865,732	19,624,905	82%	4,240,827
2007	25,796,746	21,428,415	83%	4,368,331
2008	27,627,637	22,548,676	82%	5,078,961
2009	28,062,295	23,829,090	85%	4,233,205
2010	29,723,527	25,204,532	85%	4,518,995
2011	31,456,078	26,428,773	84%	5,027,305
2012	33,255,992	27,575,708	83%	5,680,284
2013	35,902,887	29,090,324	81%	6,812,563
2014	38,411,733	30,544,618	80%	7,867,115
2015	43,085,035	31,985,381	74%	11,099,654
2016	45,130,422	33,511,638	74%	11,618,784
2017	47,425,727	35,392,641	75%	12,033,086
2018	49,251,721	36,760,104	75%	12,491,617

Notes: Actuarial assumptions were revised for the 2004, 2008, 2009, 2010, 2011, 2012 and 2015 actuarial valuations.

The Valuation Assets include assets from Surplus divisions, if any.

Years where historical information is not available will be displayed with zero values.

Tables 8 and 9: Division-Based Comparative Schedules

Division 01 - General

Table 8-01: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 9,324,018	$ 7,784,233	83%	$ 1,539,785
2009	9,578,812	8,256,767	86%	1,322,045
2010	10,216,499	8,728,809	85%	1,487,690
2011	10,936,095	9,150,679	84%	1,785,416
2012	11,481,519	9,484,077	83%	1,997,442
2013	12,399,891	9,909,908	80%	2,489,983
2014	13,234,713	10,258,712	78%	2,976,001
2015	14,619,983	10,494,173	72%	4,125,810
2016	15,180,469	10,767,766	71%	4,412,703
2017	15,597,376	11,184,045	72%	4,413,331
2018	16,171,834	11,306,032	70%	4,865,802

Notes: Actuarial assumptions were revised for the 2008, 2009, 2010, 2011, 2012 and 2015 actuarial valuations.

Table 9-01: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	92	$ 2,908,131	12.36%	0.00%
2009	87	2,941,173	11.95%	0.00%
2010	88	3,047,991	12.36%	0.00%
2011	88	2,988,299	12.77%	0.00%
2012	85	2,884,244	13.70%	0.00%
2013	83	2,812,236	14.90%	0.00%
2014	76	2,732,866	16.13%	0.00%
2015	70	2,553,957	$ 42,603	0.00%
2016	60	2,405,181	$ 44,625	0.00%
2017	55	2,341,820	$ 42,734	0.00%
2018	49	2,163,549	$ 45,761	0.00%

1 For open divisions, a percent of pay contribution is shown. For closed divisions, a monthly dollar contribution is shown.

2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer contributon will be adjusted.

Note: The contributions shown in Table 9 for the 12/31/2015 through 12/31/2019 valuations do **not** reflect the phase-in of the increased contribution requirements associated with the new actuarial assumptions. The full contribution without phase-in is shown in Table 9 above. The contribution requirements including the 5-year phase-in are shown on page 2.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Table 8-04: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 11,220,963	$ 8,718,467	78%	$ 2,502,496
2009	10,853,004	9,158,512	84%	1,694,492
2010	11,570,497	9,668,274	84%	1,902,223
2011	12,074,230	10,084,378	84%	1,989,852
2012	12,671,532	10,490,289	83%	2,181,243
2013	13,629,485	11,112,982	82%	2,516,503
2014	14,578,651	11,768,172	81%	2,810,479
2015	16,377,866	12,505,211	76%	3,872,655
2016	17,250,396	13,315,437	77%	3,934,959
2017	18,388,055	14,175,415	77%	4,212,640
2018	19,282,897	14,667,481	76%	4,615,416

Notes: Actuarial assumptions were revised for the 2008, 2009, 2010, 2011, 2012 and 2015 actuarial valuations.

Table 9-04: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	163	$ 5,989,679	6.92%	2.00%
2009	162	5,981,415	6.11%	2.00%
2010	160	6,011,214	6.42%	2.00%
2011	163	6,117,070	6.34%	2.00%
2012	162	6,269,957	6.59%	2.00%
2013	181	7,265,813	6.66%	2.00%
2014	195	8,104,097	6.73%	2.00%
2015	192	8,380,394	7.90%	2.00%
2016	193	8,523,914	$ 58,928	2.00%
2017	164	7,867,393	$ 58,023	2.00%
2018	146	7,436,981	$ 61,415	2.00%

1 For open divisions, a percent of pay contribution is shown. For closed divisions, a monthly dollar contribution is shown.

2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer contributon will be adjusted.

Note: The contributions shown in Table 9 for the 12/31/2015 through 12/31/2019 valuations do **not** reflect the phase-in of the increased contribution requirements associated with the new actuarial assumptions. The full contribution without phase-in is shown in Table 9 above. The contribution requirements including the 5-year phase-in are shown on page 2.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Table 8-10: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 838,721	$ 664,540	79%	$ 174,181
2009	873,690	688,066	79%	185,624
2010	877,969	705,300	80%	172,669
2011	925,269	728,893	79%	196,376
2012	974,851	751,208	77%	223,643
2013	1,062,687	784,425	74%	278,262
2014	1,135,183	812,651	72%	322,532
2015	1,262,100	835,190	66%	426,910
2016	1,286,546	860,339	67%	426,207
2017	1,399,505	876,490	63%	523,015
2018	1,426,559	850,595	60%	575,964

Notes: Actuarial assumptions were revised for the 2008, 2009, 2010, 2011, 2012 and 2015 actuarial valuations.

Table 9-10: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	8	$ 212,369	13.32%	0.00%
2009	8	241,505	13.22%	0.00%
2010	8	238,960	13.14%	0.00%
2011	8	239,674	13.54%	0.00%
2012	8	241,071	14.60%	0.00%
2013	8	232,396	16.22%	0.00%
2014	7	221,624	$ 3,062	0.00%
2015	7	213,623	$ 3,731	0.00%
2016	7	204,573	$ 3,674	0.00%
2017	4	126,854	$ 4,091	0.00%
2018	4	130,430	$ 4,468	0.00%

1 For open divisions, a percent of pay contribution is shown. For closed divisions, a monthly dollar contribution is shown.

2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer contributon will be adjusted.

Note: The contributions shown in Table 9 for the 12/31/2015 through 12/31/2019 valuations do **not** reflect the phase-in of the increased contribution requirements associated with the new actuarial assumptions. The full contribution without phase-in is shown in Table 9 above. The contribution requirements including the 5-year phase-in are shown on page 2.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Table 8-20: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 5,305,751	$ 4,434,226	84%	$ 871,525
2009	5,856,505	4,854,101	83%	1,002,404
2010	6,945,716	6,102,149	88%	843,567
2011	7,520,484	6,464,823	86%	1,055,661
2012	8,128,090	6,850,134	84%	1,277,956
2013	8,810,824	7,283,009	83%	1,527,815
2014	9,460,359	7,701,270	81%	1,759,089
2015	10,795,262	8,122,286	75%	2,672,976
2016	11,341,874	8,499,990	75%	2,841,884
2017	11,898,276	9,028,995	76%	2,869,281
2018	12,123,881	9,382,570	77%	2,741,311

Notes: Actuarial assumptions were revised for the 2008, 2009, 2010, 2011, 2012 and 2015 actuarial valuations.

Table 9-20: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	46	$ 1,907,379	12.37%	0.00%
2009	48	2,170,116	12.55%	0.00%
2010	49	2,109,773	12.49%	0.00%
2011	46	2,049,361	12.76%	0.00%
2012	48	2,118,600	13.40%	0.00%
2013	48	2,063,125	14.32%	0.00%
2014	43	2,006,025	$ 24,858	0.00%
2015	40	1,961,306	$ 31,696	0.00%
2016	39	1,982,969	$ 33,804	0.00%
2017	38	1,957,544	$ 32,805	0.00%
2018	34	1,811,370	$ 31,022	0.00%

1 For open divisions, a percent of pay contribution is shown. For closed divisions, a monthly dollar contribution is shown.

2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer contributon will be adjusted.

Note: The contributions shown in Table 9 for the 12/31/2015 through 12/31/2019 valuations do **not** reflect the phase-in of the increased contribution requirements associated with the new actuarial assumptions. The full contribution without phase-in is shown in Table 9 above. The contribution requirements including the 5-year phase-in are shown on page 2.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Table 8-HA: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 0	$ 0	0%	$ 0
2009	0	0	0%	0
2010	0	0	0%	0
2011	0	0	0%	0
2012	0	0	0%	0
2013	0	0	0%	0
2014	2,827	3,813	135%	(986)
2015	24,083	20,742	86%	3,341
2016	71,137	68,106	96%	3,031
2017	142,515	127,696	90%	14,819
2018	246,550	207,251	84%	39,299

Notes: Actuarial assumptions were revised for the 2008, 2009, 2010, 2011, 2012 and 2015 actuarial valuations.

Table 9-HA: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	0	$ 0	$ 0	0.00%
2009	0	0	$ 0	0.00%
2010	0	0	$ 0	0.00%
2011	0	0	$ 0	0.00%
2012	0	0	$ 0	0.00%
2013	0	0	$ 0	0.00%
2014	5	161,752	4.97%	0.00%
2015	9	310,308	5.49%	0.00%
2016	22	710,949	5.36%	0.00%
2017	32	1,002,525	5.56%	0.00%
2018	40	1,434,139	5.96%	0.00%

1 For open divisions, a percent of pay contribution is shown. For closed divisions, a monthly dollar contribution is shown.

2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer contributon will be adjusted.

Note: The contributions shown in Table 9 for the 12/31/2015 through 12/31/2019 valuations do **not** reflect the phase-in of the increased contribution requirements associated with the new actuarial assumptions. The full contribution without phase-in is shown in Table 9 above. The contribution requirements including the 5-year phase-in are shown on page 2.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Division S1 - Surplus assoc div 01

Table 8-S1: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 0	$ 0		$ 0
2009	0	0		0
2010	0	0		0
2011	0	0		0
2012	0	0		0
2013	0	0		0
2014	0	0		0
2015	0	0		0
2016	0	0		0
2017	0	0		0
2018	0	303,295		(303,295)

Notes: Actuarial assumptions were revised for the 2008, 2009, 2010, 2011, 2012 and 2015 actuarial valuations.

Years where historical information is not available, will be displayed with zero values.

Division S2 - Surplus assoc div 10

Table 8-S2: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 0	$ 0		$ 0
2009	0	0		0
2010	0	0		0
2011	0	0		0
2012	0	0		0
2013	0	0		0
2014	0	0		0
2015	0	0		0
2016	0	0		0
2017	0	0		0
2018	0	42,880		(42,880)

Notes: Actuarial assumptions were revised for the 2008, 2009, 2010, 2011, 2012 and 2015 actuarial valuations.

Years where historical information is not available, will be displayed with zero values.

Table 10: Division-Based Layered Amortization Schedule

Division 01 - General

Table 10-01: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 1/1/2020		
				Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ 4,125,810	23	$ 4,327,962	20	$ 314,160
(Gain)/Loss	12/31/2016	440,729	22	480,226	20	34,860
(Gain)/Loss	12/31/2017	(341,356)	21	(369,479)	20	(26,820)
(Gain)/Loss	12/31/2018	447,168	20	481,823	20	34,980
Total				**$ 4,920,532**		**$ 357,180**

[1] For each type of UAL (layer), this is the original balance as of the date the layer was established.

[2] According to the MERS amortization policy, each type of UAL (layer) is amortized over a specific period (see Appendix on MERS website).

[3] This is the remaining balance as of the valuation date, projected to the beginning of the fiscal year shown above.

The unfunded accrued liability (UAL) as of December 31, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 valuation to take into account the expected future contributions that are based on past valuations. Each type of UAL (layer) is amortized over the appropriate period. Please see the Appendix on the MERS website for a detailed description of the amortization policy.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

Table 10-04: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 1/1/2020		
				Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ 3,872,655	23	$ 4,041,109	16	$ 342,864
(Gain)/Loss	12/31/2016	179,358	20	192,994	16	16,380
(Gain)/Loss	12/31/2017	(27,278)	18	(29,290)	16	(2,484)
(Gain)/Loss	12/31/2018	395,924	16	426,608	16	36,192
Total				**$ 4,631,421**		**$ 392,952**

[1] For each type of UAL (layer), this is the original balance as of the date the layer was established.

[2] According to the MERS amortization policy, each type of UAL (layer) is amortized over a specific period (see Appendix on MERS website).

[3] This is the remaining balance as of the valuation date, projected to the beginning of the fiscal year shown above.

The unfunded accrued liability (UAL) as of December 31, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 valuation to take into account the expected future contributions that are based on past valuations. Each type of UAL (layer) is amortized over the appropriate period. Please see the Appendix on the MERS website for a detailed description of the amortization policy.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

Table 10-10: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 1/1/2020		
				Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ 426,910	23	$ 450,648	20	$ 32,712
(Gain)/Loss	12/31/2016	12,615	22	13,751	20	996
(Gain)/Loss	12/31/2017	63,777	21	69,025	20	5,016
(Gain)/Loss	12/31/2018	44,943	20	48,426	20	3,516
Total				**$ 581,850**		**$ 42,240**

[1] For each type of UAL (layer), this is the original balance as of the date the layer was established.

[2] According to the MERS amortization policy, each type of UAL (layer) is amortized over a specific period (see Appendix on MERS website).

[3] This is the remaining balance as of the valuation date, projected to the beginning of the fiscal year shown above.

The unfunded accrued liability (UAL) as of December 31, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 valuation to take into account the expected future contributions that are based on past valuations. Each type of UAL (layer) is amortized over the appropriate period. Please see the Appendix on the MERS website for a detailed description of the amortization policy.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

Table 10-20: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 1/1/2020		
				Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ 2,672,976	23	$ 2,837,227	20	$ 205,956
(Gain)/Loss	12/31/2016	238,036	22	259,368	20	18,828
(Gain)/Loss	12/31/2017	(192,849)	21	(208,736)	20	(15,156)
(Gain)/Loss	12/31/2018	(133,479)	20	(143,824)	20	(10,440)
Total				**$ 2,744,035**		**$ 199,188**

[1] For each type of UAL (layer), this is the original balance as of the date the layer was established.

[2] According to the MERS amortization policy, each type of UAL (layer) is amortized over a specific period (see Appendix on MERS website).

[3] This is the remaining balance as of the valuation date, projected to the beginning of the fiscal year shown above.

The unfunded accrued liability (UAL) as of December 31, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 valuation to take into account the expected future contributions that are based on past valuations. Each type of UAL (layer) is amortized over the appropriate period. Please see the Appendix on the MERS website for a detailed description of the amortization policy.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

Table 10-HA: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 1/1/2020		
				Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ 3,341	23	$ 4,043	20	$ 288
(Gain)/Loss	12/31/2016	(849)	22	(933)	20	(72)
(Gain)/Loss	12/31/2017	11,728	21	12,694	20	924
(Gain)/Loss	12/31/2018	23,556	20	25,382	20	1,848
Total				**$ 41,186**		**$ 2,988**

[1] For each type of UAL (layer), this is the original balance as of the date the layer was established.

[2] According to the MERS amortization policy, each type of UAL (layer) is amortized over a specific period (see Appendix on MERS website).

[3] This is the remaining balance as of the valuation date, projected to the beginning of the fiscal year shown above.

The unfunded accrued liability (UAL) as of December 31, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 valuation to take into account the expected future contributions that are based on past valuations. Each type of UAL (layer) is amortized over the appropriate period. Please see the Appendix on the MERS website for a detailed description of the amortization policy.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

GASB 68 Information

The following information has been prepared to provide some of the information necessary to complete GASB Statement No. 68 disclosures. Statement 68 is effective for fiscal years beginning after June 15, 2014. Additional resources, including an Implementation Guide, are available at http://www.mersofmich.com/.

Actuarial Valuation Date:	12/31/2018
Measurement Date of the Total Pension Liability (TPL):	12/31/2018

At 12/31/2018, the following employees were covered by the benefit terms:

Inactive employees or beneficiaries currently receiving benefits:	200
Inactive employees entitled to but not yet receiving benefits (including refunds):	249
Active employees:	273
	722

Total Pension Liability as of 12/31/2017 measurement date:	$	46,146,019
Total Pension Liability as of 12/31/2018 measurement date:	$	47,948,551
Service Cost for the year ending on the 12/31/2018 measurement date:	$	946,226
Change in the Total Pension Liability due to:		
- Benefit changes[1]:	$	0
- Differences between expected and actual experience[2]:	$	(695,119)
- Changes in assumptions[2]:	$	0

[1] A change in liability due to benefit changes is immediately recognized when calculating pension expense for the year.

[2] Changes in liability due to differences between actual and expected experience, and changes in assumptions, are recognized in pension expense over the average remaining service lives of all employees.

Average expected remaining service lives of all employees (active and inactive):		3
Covered employee payroll: (Needed for Required Supplementary Information)	$	12,976,469

Sensitivity of the Net Pension Liability to changes in the discount rate:

	1% Decrease (7.00%)	Current Discount Rate (8.00%)	1% Increase (9.00%)
Change in Net Pension Liability as of 12/31/2018:	$ 5,554,198	$ -	$ (4,714,331)

Note: The current discount rate shown for GASB 68 purposes is higher than the MERS assumed rate of return. This is because for GASB 68 purposes, the discount rate must be gross of administrative expenses, whereas for funding purposes it is net of administrative expenses.

GASB 68 Information

This page is for those municipalities who need to "roll-forward" their total pension liability due to the timing of completion of the actuarial valuation in relation to their fiscal year-end.

The following information has been prepared to provide some of the information necessary to complete GASB Statement No. 68 disclosures. Statement 68 is effective for fiscal years beginning after June 15, 2014. Additional resources, including an Implementation Guide, are available at www.mersofmich.com.

Actuarial Valuation Date:	12/31/2018
Measurement Date of the Total Pension Liability (TPL):	12/31/2019

At 12/31/2018, the following employees were covered by the benefit terms:

Inactive employees or beneficiaries currently receiving benefits:	200
Inactive employees entitled to but not yet receiving benefits (including refunds):	249
Active employees:	273
	722

Total Pension Liability as of 12/31/2018 measurement date:	$	48,626,238
Total Pension Liability as of 12/31/2019 measurement date:	$	50,274,605
Service Cost for the year ending on the 12/31/2019 measurement date:	$	959,944
Change in the Total Pension Liability due to:		
- Benefit changes[1]:	$	0
- Differences between expected and actual experience[2]:	$	(731,901)
- Changes in assumptions[2]:	$	0

[1] A change in liability due to benefit changes is immediately recognized when calculating pension expense for the year.

[2] Changes in liability due to differences between actual and expected experience, and changes in assumptions, are recognized in pension expense over the average remaining service lives of all employees.

Average expected remaining service lives of all employees (active and inactive):	3
Covered employee payroll: (Needed for Required Supplementary Information)	$ 12,976,469

Sensitivity of the Net Pension Liability to changes in the discount rate:

	1% Decrease (7.00%)	Current Discount Rate (8.00%)	1% Increase (9.00%)
Change in Net Pension Liability as of 12/31/2019:	$ 5,718,941	$ -	$ (4,859,130)

Note: The current discount rate shown for GASB 68 purposes is higher than the MERS assumed rate of return. This is because for GASB 68 purposes, the discount rate must be gross of administrative expenses, whereas for funding purposes it is net of administrative expenses.

Benefit Provision History

The following benefit provision history is provided by MERS. Any corrections to this history or discrepancies between this information and information displayed elsewhere in the valuation report should be reported to MERS. All provisions are listed by date of adoption.

01 - General

1/1/2019	Service Credit Purchase Estimates - No
12/1/2016	Service Credit Purchase Estimates - Yes
1/1/2000	Benefit B-4 (80% max)
1/1/1995	Benefit B-2
12/17/1991	Day of work defined as 4 Hours a Day for All employees.
1/1/1991	E1 2.5% COLA for past retirees (01/01/1991)
1/1/1989	Member Contribution Rate 0.00%
1/1/1988	E1 2.5% COLA for past retirees (01/01/1988)
11/19/1986	Day of work defined as 120 Hours a Month for All employees.
3/18/1975	Exclude Temporary Employees
11/25/1970	Covered by Act 88
3/1/1967	Benefit C-1 (Old)
7/1/1966	Benefit FAC-5 (5 Year Final Average Compensation)
7/1/1966	10 Year Vesting
7/1/1966	Benefit C (Old)
7/1/1966	Member Contribution Rate 3.00% Under $4,200.00 - Then 5.00%
7/1/1966	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

04 - MCF

1/1/2017	Service Credit Purchase Estimates - No
1/1/2017	Accelerated to 15-year Amortization
1/1/2017	DC Adoption Date 01-01-2017
12/1/2016	Service Credit Purchase Estimates - Yes
6/1/2005	Exclude Temporary Employees
6/1/2005	Part-time Full-time Conversion
6/1/2005	Day of work defined as 90 Hours a Month for Part Time employees.
6/1/2005	Day of work defined as 120 Hours a Month for Full Time employees.
2/1/2000	Member Contribution Rate 2.00%
1/1/2000	E1 2.5% COLA for past retirees (01/01/2000)
11/1/1998	Member Contribution Rate 0.75%
1/1/1989	E1 2.5% COLA for past retirees (01/01/1989)
1/1/1982	Member Contribution Rate 0.00%
11/25/1970	Covered by Act 88
3/1/1967	Benefit C-1 (Old)
7/1/1966	Benefit FAC-5 (5 Year Final Average Compensation)
7/1/1966	10 Year Vesting
7/1/1966	Fiscal Month - January
7/1/1966	Benefit C (Old)
7/1/1966	Member Contribution Rate 3.00% Under $4,200.00 - Then 5.00%
	Defined Benefit Normal Retirement Age - 60

04 - MCF

	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

10 - Gnrl Dial a Ride

1/1/2019	Service Credit Purchase Estimates - No
12/1/2016	Service Credit Purchase Estimates - Yes
1/1/2002	Benefit B-4 (80% max)
1/1/1995	Benefit B-2
12/17/1991	Day of work defined as 4 Hours a Day for All employees.
1/1/1991	E1 2.5% COLA for past retirees (01/01/1991)
1/1/1989	Benefit FAC-5 (5 Year Final Average Compensation)
1/1/1989	10 Year Vesting
1/1/1989	Benefit C-1 (Old)
1/1/1989	Member Contribution Rate 0.00%
11/25/1970	Covered by Act 88
7/1/1966	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

20 - Sheriff Dept

1/1/2019	Service Credit Purchase Estimates - No
12/1/2016	Service Credit Purchase Estimates - Yes
1/1/2000	Benefit FAC-5 (5 Year Final Average Compensation)
1/1/2000	10 Year Vesting
1/1/2000	Benefit B-4 (80% max)
1/1/2000	Benefit F55 (With 20 Years of Service)
1/1/2000	Member Contribution Rate 0.00%
12/17/1991	Day of work defined as 4 Hours a Day for All employees.
11/25/1970	Covered by Act 88
7/1/1966	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

HA - Shrf&Grnldal 1/14 &Gnrl 1/15

1/1/2016	Probationary Period 2 Months
1/1/2014	Exclude Temporary Employees requiring less than 12 months
1/1/2014	Benefit FAC-3 (3 Year Final Average Compensation)
1/1/2014	6 Year Vesting
1/1/2014	Non Standard Compensation Definition
1/1/2014	Day of work defined as 100 Hours a Month for All employees.
1/1/2014	1.25% Multiplier
1/1/2014	Participant Contribution Rate 0%
11/25/1970	Covered by ACT 88
7/1/1966	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	No Early Reduced Conditions

S1 - Surplus assoc div 01

7/1/1966	Fiscal Month - January

S2 - Surplus assoc div 10

7/1/1966	Fiscal Month - January

Plan Provisions, Actuarial Assumptions, and Actuarial Funding Method

Details on MERS plan provisions, actuarial assumptions, and actuarial methodology can be found in the Appendix. Some actuarial assumptions are specific to this municipality and its divisions. These are listed below.

Increase in Final Average Compensation

Division	FAC Increase Assumption
All Divisions	2.00%

Withdrawal Rate Scaling Factor

Division	Withdrawal Rate Scaling Factor
All Divisions	114%

Miscellaneous and Technical Assumptions

Loads – None.

Amortization Policy for Closed Divisions

Closed Division	Amortization Option
04 - MCF	Accelerated to 15-Year Amortization

Please see Appendix on MERS website for a detailed description of the amortization options available for closed divisions within an open municipality.

Risk Commentary

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

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

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

- **Investment Risk** – actual investment returns may differ from the expected returns;
- **Asset/Liability Mismatch** – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
- **Salary and Payroll Risk** – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
- **Longevity Risk** – members may live longer or shorter than expected and receive pensions for a period of time other than assumed; and
- **Other Demographic Risks –** members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

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

PLAN MATURITY MEASURES

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

1. Ratio of the market value of assets to total payroll	2.6
2. Ratio of actuarial accrued liability to payroll	3.8
3. Ratio of actives to retirees and beneficiaries	1.4
4. Ratio of market value of assets to benefit payments	16.0
5. Ratio of net cash flow to market value of assets (boy)	0.1%

RATIO OF MARKET VALUE OF ASSETS TO TOTAL PAYROLL

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

RATIO OF ACTUARIAL ACCRUED LIABILITY TO PAYROLL

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

RATIO OF ACTIVES TO RETIREES AND BENEFICIARIES

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

RATIO OF MARKET VALUE OF ASSETS TO BENEFIT PAYMENTS

The MERS' Actuarial Policy requires a total minimum contribution equal to the excess (if any) of three times the expected annual benefit payments over the projected market value of assets as of the participating municipality or court's Fiscal Year for which the contribution applies. The ratio of market value of assets to benefit payments as of the valuation date provides an indication of whether the division is at risk for triggering the minimum contribution rule in the near term. If the division triggers this minimum contribution rule, the required employer contributions could increase dramatically relative to previous valuations.

RATIO OF NET CASH FLOW TO MARKET VALUE OF ASSETS

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

State Reporting

The following information has been prepared to provide some of the information necessary to complete the pension reporting requirements for the State of Michigan's Local Government Retirement System Annual Report (Form No. 5572). Additional resources are available at www.mersofmich.com and on the State website.

Form 5572 Line Reference	Description	Result
10	**Membership as of December 31, 2018**	
11	Indicate number of active members	273
12	Indicate number of inactive members	70
13	Indicate number of retirees and beneficiaries	200
14	**Investment Performance for Calendar Year Ending December 31, 2018[1]**	
15	Enter actual rate of return - prior 1-year period	-3.64%
16	Enter actual rate of return - prior 5-year period	4.94%
17	Enter actual rate of return - prior 10-year period	8.25%
18	**Actuarial Assumptions**	
19	Actuarial assumed rate of investment return[2]	7.75%
20	Amortization method utilized for funding the system's unfunded actuarial accrued liability, if any	Level Percent
21	Amortization period utilized for funding the system's unfunded actuarial accrued liability, if any[3]	20
22	Is each division within the system closed to new employees?[4]	No
23	**Uniform Assumptions**	
24	Enter retirement pension system's actuarial value of assets using uniform assumptions	$36,760,104
25	Enter retirement pension system's actuarial accrued liabilities using uniform assumptions	$53,502,749
27	Actuarially Determined Contribution (ADC) using uniform assumptions, Fiscal Year Ending December 31,2019	$2,364,072

1. The Municipal Employees' Retirement System's investment performance has been provided to GRS from MERS Investment Staff and included here for reporting purposes. This investment performance figures reported are net of fees on a rolling calendar-year basis for the previous 1-, 5-, and 10-year periods as required under PA 530.
2. Net of administrative and investment expenses.
3. Populated with the longest amortization period remaining in the amortization schedule, across all divisions in the plan. This is when each division and the plan in total is expected to reach 100% funded if all assumptions are met.
4. If all divisions within the employer are closed, "yes." If at least one division is open (including shadow divisions) indicate "no."