

ACTUARIAL REVIEW OF THE  
2020 ACTUARIAL VALUATION OF THE  
MUNICIPAL EMPLOYEES' RETIREMENT SYSTEM



ACTUARIAL SERVICES  
PRESENTED TO THE PUBLIC RETIREMENT SYSTEMS' ACTUARIAL COMMITTEE  
JANUARY 19, 2021



LOUISIANA LEGISLATIVE AUDITOR  
DARYL G. PURPERA, CPA, CFE

December 22, 2020

Mr. Warren Ponder, Executive Director  
Municipal Employees' Retirement System of Louisiana  
7937 Office Park Boulevard  
Baton Rouge, Louisiana 70809

***Re: Actuarial Review of the 2020 Actuarial Valuation***

Dear Mr. Ponder:

To fulfill the requirements of R.S. 11:127(C) to the Public Retirement Systems' Actuarial Committee (PRSAC) for 2020, the Louisiana Legislative Auditor (LLA) has conducted an Actuarial Review for the Municipal Employees' Retirement System (MERS or System).

The remainder of this letter contains the results of our Actuarial Review of your June 30, 2020 Actuarial Valuation (prepared by G.S. Curran & Company and dated December 7, 2020). More specifically, we have evaluated for appropriateness certain actuarial assumptions and methods employed by the System and its actuary.

I would like to thank you, your staff, and the board's actuary for the cooperation and assistance provided for this review.

Sincerely,

Daryl G. Purpera, CPA, CFE  
Legislative Auditor

DGP:LPG:JJR:ch

cc: G.S. Curran & Company

2020 ACTUARIAL REVIEW FOR MERS

## Scope of Review

The 2020 Actuarial Valuation report for the Municipal Employees' Retirement System (MERS or System) for funding purposes was prepared by G.S. Curran & Company and dated December 7, 2020.

This Actuarial Review of that report was prepared by James J. Rizzo, Senior Consultant and Actuary, and Piotr Krekora, Consultant and Actuary, both employed by Gabriel, Roeder, Smith and Company (GRS). GRS is under contract with the Louisiana Legislative Auditor (LLA) to provide backup, research, calculations, actuarial services and advice to the LLA.

This Actuarial Review includes evaluations of the appropriateness of key actuarial assumptions and methods. However, a full actuarial valuation replicating the System actuary's results was not performed; nor was a full actuarial valuation performed using recommended assumptions and methods. Finally, we did not perform a full and detailed research analysis to determine our preferred or most appropriate net return assumption, but we applied reasonable estimating techniques to develop our recommendations.

This Actuarial Review is limited to (1) recommendations for a more appropriate treatment of MERS' gain-sharing COLA benefits, (2) recommendations for a more appropriate investment return assumption, and (3) the actuary's use of acceptable mortality tables.

## Our Findings

### 1. Gain-sharing Cost-of-Living Adjustments (COLAs).

The cost of future COLAs is currently not included in the 2020 Actuarial Valuation. Future COLAs are currently recognized in the calculations of costs and liabilities only after they are granted. However, the System's retirees are likely to receive COLA benefit increases with some regularity.

There are, basically, two broad categories of COLAs available to MERS:

- "Gain-sharing COLA." This is a COLA granted when the actuarial earnings exceed the actuarial assumption by a sufficient margin, and
- "FDA COLA." This is a COLA granted and paid out of those funds that have been previously earmarked as "excess" contributions and accumulated in the Funding Deposit Account (FDA).

There are many other rules for COLAs relating to how often and when they may be granted, minimum and maximum percentage and dollar increases granted, and who is eligible to receive the increases.

While the statutes permit COLAs to be funded with the balance in the FDA, it seems less likely the FDA will be used for that purpose instead of using "excess interest." A portion of

the FDA funds was used to offset the remaining balance of the frozen unfunded accrued liability for Plan B as of June 30, 2018, and to reduce employer contributions for the fiscal years ending June 30, 2015, and June 30, 2017. *The board of trustees have exhibited a pattern of using the FDA balances for purposes other than granting COLAs.*

While the System's actuarial rate of return has not exceeded its assumed rate for several years, that trend is not expected to continue in the future. We expect the System to earn amounts in excess of the actuarial valuation rate in some future years, thereby *permitting* the board to authorize a Gain-sharing COLA benefit if it so desires.

Therefore, in our opinion it seems more likely to expect future COLAs to be of the *Gain-sharing* variety, rather than the *FDA* variety. That opinion could change based on future actions of the board.

Whether and how much *future* COLAs should be recognized in annual actuarial valuations for funding purposes depends on whether the future COLAs expected are of the "Gain-sharing COLA" variety or the "FDA COLA" variety.

#### ***Actuarial Treatment of "FDA COLAs"***

If there were a reasonable expectation that future COLAs will be of the "FDA COLA" type, we would find it appropriate to wait until COLAs are actually granted before recognizing them in the actuarial valuations.

However, based on the history of MERS' use of FDA balances, we expect the balance in the FDA to be used for other purposes in the future (e.g., reducing the net direct employer contribution or reducing the present value of future costs), rather than for granting COLAs.

#### ***Actuarial Treatment of "Gain-sharing COLAs"***

"Gain-sharing COLAs" for MERS are permitted when the actuarial investment earnings exceed the actual valuation rate achieved when calculated on the actuarial basis, effectively sharing the better-than-assumed gains with the eligible members. The authority for the MERS board to pay Gain-sharing COLAs is also subject to various timing and other conditions and restrictions.

Practically speaking, there are two types of Gain-sharing COLAs outlined in statutes for MERS.

- R.S. 11:1761(A) describes a plan-specific COLA, and
- R.S. 11:246 describes "additional" cost-of-living adjustments.

The statutory *permission* to grant future Gain-sharing COLAs is actuarially predictable. The statutory provisions that give rise to *permitting* MERS Gain-sharing COLAs operate similar to auto-pilot. The rules are set forth in statutes. However, when a Gain-sharing COLA is *permitted* to be paid, the MERS board has discretionary authority to grant, or not to grant, a Gain-sharing COLA to increase eligible members' benefits.

*Refer to the Appendix for the recent history of when, how much, and what type of COLA MERS was permitted to grant and actually granted.*

When there is a reasonable expectation (not a guaranteed expectation) of “Gain-sharing COLAs” being granted in the future, an actuary should recognize the likelihood and magnitude of future “Gain-sharing COLAs” in the measurement of a system’s costs and liabilities for both funding and accounting purposes.

**Conclusion** -- By not recognizing actuarially-expected future Gain-sharing COLA benefits in the actuarial valuations, MERS is not appropriately advance-funding all of the plan’s reasonably expected benefits in our opinion. We recommend that the MERS board engage its actuary to undertake a quantitative actuarial analysis of the operation of the gain-sharing provisions, in order to be able to advise the board about the long-term costs and liabilities associated with future gain-sharing COLAs.

Last year, we prepared a detailed analysis for the 2019 Actuarial Valuation (presented in an Actuarial Valuation report dated January 15, 2020) concerning the costs and liabilities for future COLA benefits. The actuarial analysis concluded that MERS’ future COLA benefits are actuarially equivalent to a fixed annual COLA of 0.45% for retirees prior to age 65 and 0.65% thereafter. This is an actuarially reasonable approximation of the future workings of the actual statutory gain-sharing COLA template that could be integrated into the annual valuation.

## 2. Investment Return Assumption

For this 2020 Actuarial Review, a detailed analysis of independent experts' 2020 forecasts for MERS' portfolio was not undertaken.

In the last detailed analysis, prepared by the Actuary for the LLA for the 2019 Actuarial Valuation (presented in an Actuarial Valuation Report dated January 15, 2020) using forecasts published in 2019, we developed a most appropriate return assumption of 6.40%. For this 2020 Actuarial Review, we present only observational commentary and estimate the most appropriate return assumption as 5.75%.

### *Comparisons*

Following are the primary reasons why our 5.75% estimated most appropriate return assumption for the System's 2020 Actuarial Valuation differs from the 6.40% assumption we determined to be most appropriate last year when we conducted our own 2019 actuarial valuation for the System:

- The professional inflation forecasters decreased their expectations from last year;
- The professional investment forecasters decreased their expectations for future returns;

Based on the information provided for this Actuarial Review, the asset allocation of the fund did not change from 2019 to 2020.

Following are the primary reasons why our 5.75% estimated most appropriate return assumption for the 2020 Actuarial Valuation differs from the System's 6.95% assumption adopted for the 2020 Actuarial Valuation:

- Inflation: The consensus average expectations of professional inflation forecasters published in 2020 for the mid-term and longer-term lead to a 2.00% future inflation assumption embedded in the return assumption, while MERS' actuary indicates that a 2.50% assumption about future inflation embedded in the return assumption.
- Time Horizon: Our most appropriate return assumption is between the mid-term consensus average (a lower rate) and the longer-term consensus average (higher) of professional investment forecasters. MERS' board of trustees relies on a straight long-term forecast, without reflecting what is expected to happen during the next 10 years. We believe the mid-term expectations should be considered in the process.
- Methodology: The Actuary for the LLA and the System's actuary both rely on various independent professional forecasts to inform our opinions. In doing so, we both are applying an accepted principle in forecasting science. However, our methodologies are different: (a) The Actuary for the LLA uses a more direct approach, mapping MERS' asset classes and allocations directly to each professional forecaster's capital market assumptions to obtain each forecaster's own separate opinion about MERS' portfolio, while (b) The System's actuary first develops a single *standardized* set of asset classes and capital market assumptions for all its clients based on a mapping amalgamation of the

experts' capital market assumptions, then maps MERS' asset classes and allocations to those standardized asset classes and capital market assumptions. In our opinion, the direct approach is less prone to "mapping error" than an amalgamated standardized set of asset classes, but we do not know if it is significant. Furthermore, we did not pursue reconciling some questions concerning internal steps in the System actuary's methodology.

- **Board Action:** MERS' actuary advised the board that the 7.00% return assumption from the 2019 Actuarial Valuation was at the top of the updated reasonable range. For the 2020 Actuarial Valuation, the MERS' board of trustees adopted a rate just below the top of its actuary's reasonable range, specifically, 6.95%.

In our opinion, the appropriate benchmark for whether 6.95% is conservative or optimistic would be to compare it to a consensus average of several expert investment forecasters and applying the fund's asset allocation, with adjustments for investment expenses and cash flow expectations.

Based on our 2019 analysis, the most appropriate investment return assumption was estimated to be 6.40% at the time.

While MERS' board lowered the investment return assumption from 7.0% for the 2019 Actuarial Valuation to 6.95% for the 2020 Actuarial Valuation, the downward movement in return expectations among professional investment forecasters over the last several years has generally been at a more rapid and significant pace. What we have seen in the mainstream of professional forecasters since 2019 was a decrease for 2020's mid-term and longer-term forecasts.

Based on a simplified analysis of these factors, we estimate the most appropriate return assumption for MERS' 2020 Actuarial Valuation would move down from our 6.40% in 2019 to approximately 5.75% for 2020 (compared to the System's 6.95% assumption).

It's worth noting that over the last four years, the System's return assumptions have averaged more than 100 basis points higher than the LLA's most appropriate rate.

An overly optimistic return assumption in a retirement system, applied repeatedly, can (a) create repeated actuarial losses, (b) cause underfunding, and (c) undermine the actuarial integrity of the pension-promise made to career public servants.

Furthermore, a return assumption that is an outlier compared to the mainstream of professional forecasters is not a "best estimate" and obscures the fair representation of future costs and liabilities in public financial disclosures.

### ***A Disciplined Process***

The cost of being materially wrong is substantial, whether it is over a 10-year period or a 30-year period, and could be detrimental to plan members (jeopardizing actuarial benefit security) and detrimental to taxpayers (unexpected contribution increases).

The process of our assessment of MERS' 2020 actuarial return assumption is captured in our treatment of the most significant factors in setting, defending or assessing the appropriateness of an assumed return:

1. Forecasts of future rates of *inflation* (forward-looking), as expected by experts who are both independent and nationally recognized in the field of inflation forecasting;
2. Forecasts of future *investment returns* (forward-looking) and other capital market assumptions for various asset classes as expected by experts who are both independent and nationally recognized in the field of investment return forecasting;
3. The System investment policy's current and future *asset allocation percentages*, by asset class;
4. *Future investment performance* of the pension fund's portfolio: (1) as expected by each independent forecaster, (2) considering the consensus average of their 50<sup>th</sup> percentile expectation for the System's compound return over time; and
5. *Expected benefit cash flow* influences how much of a fund's future earnings will be affected by mid-term forecasts versus long-term forecasts.

This disciplined process assures decision-makers that the result is a net return assumption that:

- a. Is unbiased, objective, free of agency risk (i.e., not overly influenced by what the participating agencies think is affordable);
- b. Is developed in a disciplined, robust and defensible manner; and
- c. Improves actuarial benefit security, intergenerational equity, and contribution stability.

### ***Time Horizon of Future Expectations***

In the supporting documentation for their investment return assumption in the 2019 Experience Study, MERS' actuary used the long-term (20-30 years) capital market assumptions from investment consulting firms. However, we believe an assumed rate of return between mid-term and long-term is more appropriate for MERS and for most other retirement systems. Long-term horizon forecasts (e.g., 20-30 years) are useful for one component of the process, but not to the exclusion of mid-term horizons. Pension funds are, indeed, usually long-term arrangements. However, in our opinion, 20-30 years is too long for the selection of most pension funds' assumed rate of return.

In most years, long-term expectations from reputable forecasting experts have been generally higher than mid-term expectations, creating a pattern that actuaries sometimes call *select-and-ultimate expectations*. This resembles a yield curve in the fixed income field. A lower rate expected during the select period (e.g., next 10 years) followed by a higher rate for the ultimate period (e.g., years 11 through 30).



Based on the 2019 Actuarial Valuation by the Actuary for the LLA, the majority of MERS' current assets will be paid out during the next 10 years – and will not be there to experience a higher return expected in the later years. That needs to be recognized in the selection of the return assumption, as indicated by ASOP No. 27 section 3.8.3(f).

Relying solely on a long-term time horizon may appear to justify a higher return assumption, but MERS has substantial negative cash flow (more benefits and expenses are leaving the fund than contributions coming in). It is what we often call a *mature pension plan*. This negative cash flow: (a) raises concern over the fund's ability to generate sufficient earnings to replace depleted assets and (b) is a sound actuarial reason not to employ a long-term time horizon to develop the return assumption while ignoring what is expected to happen in the mid-term. In our opinion, a 20- to 30-year time horizon for a return assumption is not appropriate for funding a mature pension plan. The return assumption time horizon should be a single equivalent rate somewhere between the mid-term and longer-term time horizons, recognizing a system's expected cash flow over the mid-term and long-term.

**Conclusion** – In the absence of conducting a detailed analysis using updated 2020 expert forecasts and in the absence of applying them to MERS' own asset allocation, investment expenses and expected cash flow, we estimate and recommend that the MERS' retirement board and actuary consider lowering the return assumption for the 2020 Actuarial Valuation to approximately 5.75%.

Multiple large and reputable independent investment forecasters' current and recent expectations for the next 10 years' investment returns are mostly driven by high stock price valuations compared to earnings, low inflation expectations, and currently low yields and interest rates. They are not expecting the next 10 years' investment returns to be anywhere near the high levels we have seen in many prior periods.

Improvements in the stock market since the dramatic COVID-induced lows in March 2020 have moved current forecasts back closer to previous expectations published prior to those COVID effects; but we have seen substantial volatility in the stock markets in the last several months and cannot predict where the economy and the markets will be in the coming fiscal years.

### 3. **Mortality Assumption**

The 2020 Actuarial Valuation (pages 68 and 70) states that the mortality assumption:

- For active member mortality is “120% of the PubG-2010(B) Employee Tables for males and females, each with the full generational MP2018 scale;”
- For annuitant and beneficiary mortality is “120% of the PubG-2010(B) Healthy Retiree Tables for males and females, each with the full generational MP2018 scale;” and
- For disabled lives mortality: “120% of the PubNS-2010(B) Disabled Retiree Tables for males and females, each with the full generational MP2018 scale.”

These 2020 mortality rates are the same as used in the 2019 Actuarial Valuation.

#### *Base Mortality Table*

A detailed analysis of the MERS base mortality tables was undertaken by the Actuary for the LLA for the 2019 Actuarial Valuation (presented in an Actuarial Valuation Report dated January 15, 2020).

To evaluate the reasonableness of the mortality assumption, we reviewed the base mortality tables (PubG-2010(B)) and the plan-specific adjustment factors (for males and for females) separately from the projection scale (MP-2018).

The Pub-2010 Mortality Tables were derived from mortality experience of large public sector retirement systems and were published by the Retirement Plans Experience Committee (RPEC) of the Society of Actuaries (SOA) in January 2019. These tables constitute the most recent and reliable standard reference tables available for purposes of national estimates of mortality for public pension plans.

Therefore, we find MERS’ base tables used in its 2020 Actuarial Valuation to be fully appropriate.

**Conclusion** – We consider the MERS’ base tables for mortality rates for non-disabled and disabled lives to be reasonable.

#### *Mortality Improvement Scale*

Mortality assumptions are usually separated into base tables (discussed above) and mortality improvement tables to recognize future improvements in mortality rates expected following the central date of the base table.

The 2020 Actuarial Valuation (pages 68 and 70) states that the mortality improvement table was the MP-2018 published by the Society of Actuaries’ Retirement Plan Experience Committee.

A detailed analysis of the mortality improvement scale was also undertaken by the Actuary for the LLA for the 2019 Actuarial Valuation (presented in an Actuarial Valuation Report dated January 15, 2020). We concluded that MP-2018 was reasonable for the 2019 actuarial valuation.

While we note that projection scale MP-2019 was a more recent projection scale available as of the 2020 Actuarial Valuation date, we find the projection scale MP-2018 used in MERS' 2020 actuarial valuation to be fully appropriate.

**Conclusion** – We consider the mortality improvement scale as applied to both non-disabled and disabled lives to be reasonable.

## Actuarial Certification

This Actuarial Review report constitutes a Statement of Actuarial Opinion. It 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 information it is purported to present. This review was performed in conformity with generally accepted actuarial principles and with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

James J. Rizzo and Piotr Krekora 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 Municipal Employees' Retirement System.



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James J. Rizzo, ASA, EA, MAAA  
Senior Consultant and Actuary  
Gabriel, Roeder, Smith & Company

December 22, 2020  
Date



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Piotr Krekora, ASA, EA, MAAA, PhD  
Consultant and Actuary  
Gabriel, Roeder, Smith & Company

December 22, 2020  
Date

## Appendix

COLA History for the Municipal Employees' Retirement System										
Actuarial Measurement Date	Statutory Conditions for COLA Granting Under:		Authorizing Gain-sharing (G-s) COLAs Pct and Recipients <sup>1</sup>		Authorizing Funding Deposit Account COLAs		Amount Granted by Board	Date Approved by Board	Effective Date of COLA	Comments
	The Window Rule <sup>2</sup> for any COLA	The Sufficient Actuarial Return Rule <sup>3</sup> for G-s COLAs	R.S. 11:1761(A) G-s COLA [Up to 2% to All Elg]	R.S. 11:246 G-s COLA [2% or Nothing, to Elg Over 65]	Balance in the FDA	FDA Balance Used?				
6/30/2020	<b>Satisfied</b> (For YE 2021)	Not Satisfied (2.9% and 3.0% vs. 7.0%)	None Permitted [To All Eligibles]	None Permitted [To Elg Over 65]	\$10,000,835 (Plan A) and \$1,748,191 (Plan B)	TBD	TBD	TBD	TBD	None permitted for failure of Actuarial Return Rule
6/30/2019	<b>Satisfied</b> (For YE 2020)	Not Satisfied (1.7% and 1.9% vs. 7.275%)	None Permitted [To All Eligibles]	None Permitted [To Elg Over 65]	\$9,346,575 (Plan A) and \$1,633,823 (Plan B)	NA	NA	NA	NA	None permitted for failure of Actuarial Return Rule
6/30/2018	<b>Satisfied</b> (For YE 2019)	Not Satisfied (2.8% and 2.7% vs. 7.4%)	None Permitted [To All Eligibles]	None Permitted [To Elg Over 65]	\$8,930,139 (Plan A) and \$1,523,023 (Plan B)	NA	NA	NA	NA	None permitted for failure of Actuarial Return Rule
6/30/2017	<b>Satisfied</b> (For YE 2018)	Not Satisfied (2.3% and 2.2% vs. 7.5%)	None Permitted [To All Eligibles]	None Permitted [To Elg Over 65]	\$8,112,406 (Plan A) and \$3,286,730 (Plan B)	Yes, to pay off Frozen UAL for Plan B	NA	NA	NA	None permitted for failure of Actuarial Return Rule
6/30/2016	<b>Satisfied</b> (For YE 2017)	Not Satisfied (0.8% and 0.7% vs. 7.5%)	None Permitted [To All Eligibles]	None Permitted [To Elg Over 65]	\$8,421,235 (Plan A) and \$3,233,725 (Plan B)	Yes, to reduce ER contributions	NA	NA	NA	None permitted for failure of Actuarial Return Rule
6/30/2015	<b>Satisfied</b> (For YE 2016)	Not Satisfied (3.7% and 3.5% vs. 7.75%)	None Permitted [To All Eligibles]	None Permitted [To Elg Over 65]	\$7,833,707 (Plan A) and \$3,008,116 (Plan B)	NA	NA	NA	NA	None permitted for failure of Actuarial Return Rule
6/30/2014 <sup>4</sup>	<b>Satisfied</b> (For YE 2015)	Not Satisfied (5.8% and 5.6% vs. 7.75%)	None Permitted [To All Eligibles]	None Permitted [To Elg Over 65]	\$8,930,139 (Plan A) and \$3,126,521 (Plan B)	Yes, to reduce ER contributions	NA	NA	NA	None permitted for failure of Actuarial Return Rule

<sup>1</sup> Per R.S. 11:1761(A), the Board is authorized to provide a COLA of up to 2% of the original benefit to all eligible pensioners. Additionally, per R.S. 11:246, the Board is authorized to provide an additional or supplemental COLA of 2% to eligible pensioners over age 65. No COLA may be provided during any fiscal year until the lapse of at least one-half of the fiscal year.

<sup>2</sup> Per R.S. 107.1(D)(4)(b) and R.S. 11:243(G)(1) and (3), the Board may grant a benefit increase only if any of the following apply: (a) the system has a funded ratio of at least 90% and has not granted a benefit increase to retirees, survivors, or beneficiaries in the most recent fiscal year, (b) the system has a funded ratio of at least 80% and has not granted such an increase in any of the two most recent fiscal years, or (c) the system has a funded ratio of at least 70% and has not granted a benefit increase to retirees, survivors, or beneficiaries in any of the three most recent fiscal years. The funded ratio as of any fiscal year is the ratio of the actuarial value of assets to the actuarial accrued liability under the funding method prescribed by the office of the legislative auditor.

<sup>3</sup> Per R.S. 11:1761(A), the Board is authorized to use interest earnings on investments of the system in excess of normal requirements to provide a COLA of up to 2% of the original benefit to all eligible pensioners. Additionally, per R.S. 11:246, the Board has the authority to provide an additional COLA of 2% to eligible pensioners over age 65 if there is sufficient excess interest earnings to fund the entire 2% additional COLA.

<sup>4</sup> The 6/30/14 valuation date marks the first year that Act 170 applies, after the trustees elected to be covered under R.S. 11:243 by 12/31/13.

## **Qualifications and Caveats**

This Actuarial Review was prepared to fulfill the requirements of R.S. 11:127(C) to the Public Retirement Systems' Actuarial Committee (PRSAC) for 2020 and is intended for use by PRSAC and those designated or approved by PRSAC. This Actuarial Review may be provided to parties other than PRSAC only in its entirety and only with the permission of PRSAC. The Louisiana Legislative Auditor is not responsible for unauthorized use of this Actuarial Review.

This Actuarial Review should not be relied on for any purpose other than the purposes described herein. This Actuarial Review assumes the continuing ability of MERS to collect the contributions necessary to fund this Plan. A determination regarding whether or not MERS is actually willing and able to do so in the future is outside our scope of expertise and was not performed.

The findings in this Actuarial Review are based on data and other information as of June 30, 2020 and forecasts published for 2020. This Actuarial Review was based upon information furnished by MERS, the System's investment consultant, the System's actuary and by numerous external inflation and investment forecasters. 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 outside parties.

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

At the time of this writing, we consider the 2020 forecasts of the future inflation and capital market assumptions (including future investment returns) from the subject matter experts to be suitable for development of a "most appropriate" net return assumption for the 2020 actuarial valuation. There has been considerable uncertainty about the economy and a lot of volatility in the markets. But for now, the robust process and results presented herein seem most appropriate.

This Actuarial Review was prepared using our proprietary valuation model and related software which in our professional judgment has the capability to provide results that are consistent with the purposes of the valuation. We performed tests to ensure that the model reasonably represents that which is intended to be modeled. We are relying on the GRS actuaries and Internal Software, Training, and Processes Team who developed and maintain the model.