

STATE OF WISCONSIN

APPENDIX TO 2023 Assembly Bill 245 (LRB-2983/1)

REPORT OF THE JOINT SURVEY COMMITTEE ON RETIREMENT SYSTEMS

(Introduced by Representatives KURTZ, RODRIGUEZ, VOS, AUGUST, BORN, ARMSTRONG, BEHNKE, BINSFELD, CALLAHAN, DALLMAN, DITTRICH, DONOVAN, DUCHOW, EDMING, GREEN, GUNDRUM, GUSTAFSON, HURD, KATSMA, KITCHENS, KNODL, KRUG, MAGNAFICI, MAXEY, MICHALSKI, MOSES, MURPHY, MURSAU, NEDWESKI, O'CONNOR, OLDENBURG, PENTERMAN, PETERSEN, PETRYK, PLUMER, PRONSCHINSKE, ROZAR, SAPIK, SCHMIDT, SCHRAA, SNYDER, SORTWELL, SPIROS, STEFFEN, SUMMERFIELD, SWEARINGEN, TUSLER, ZIMMERMAN AND WITTKE; cosponsored by Senators FELZKOWSKI, CABRAL-GUEVARA, JAMES AND QUINN.)

An Act relating to: county and municipal aid; imposing a city sales tax and an additional county sales tax to pay the unfunded actuarial accrued liability of city and county retirement systems; requiring newly hired city and county employees of certain city agencies and counties to be enrolled in the Wisconsin Retirement System; fire and police commissions of first class cities; eliminating the personal property tax; reporting certain crimes and other incidents that occur on school property or school transportation; advisory referenda; local health officers; local public protection services; exceptions to local levy limits; local regulation of certain quarry operations; emergency services; local approval of projects and activities under the Warren Knowles-Gaylord Nelson Stewardship 2000 Program; requiring a referendum; and granting rule-making authority.

PROVISIONS OF THE BILL THAT ARE THE SUBJECT OF THIS REPORT

Section 13.50 (6) (a), Stats., requires the Joint Survey Committee on Retirement Systems to prepare a report on the provisions of any bill, and any amendments to the bill, that modify the Wisconsin Retirement System (WRS) for, or make any provision for, the retirement of or payment of pensions to public officers or employees. The specific provisions of this bill that are the subject of this report include:

1. The authorization of a city sales tax and an additional county sales tax to pay the unfunded actuarial accrued liability (UAAL) of city and county retirement systems. [SECTIONS 1-6, 19-22, 44-45, 167, 174-189, 215, and 237-246 of 2023 Assembly Bill 245.]
2. The requirement for newly hired city and county employees of certain city agencies and counties to be enrolled in the WRS. [SECTIONS 42-43, 176-177, 237, 241, 244, and 246 of 2023 Assembly Bill 245.]

These provisions are described below.

Imposition of a City Sales Tax and an Additional County Sales Tax to Pay the UAAL of City and County Retirement Systems

Description

These provisions of 2023 Assembly Bill 245 permit the City of Milwaukee and Milwaukee County to impose additional sales and use taxes in order to address UAAL of their respective employee pension systems.

Current law permits a county to impose a 0.5 percent sales and use tax on the sales price of tangible personal property, goods and services that are sold or used in the county. Milwaukee County currently imposes this tax.

2023 Assembly Bill 245 permits the City of Milwaukee and Milwaukee County to impose sales and use taxes of 2.0 percent and 0.375 percent, respectively, for the purposes of reducing UAAL associated with their employee pension systems and, with respect to the city, to pay for public safety services. The taxes must be approved at referendums by City of Milwaukee or Milwaukee County voters, respectively, and the city and county must elect to join the WRS for all of its new employees.

The bill requires the City of Milwaukee and Milwaukee County to calculate required annual employer contributions using a 30-year amortization period and an annual investment return assumption that is the same or less than the annual investment return assumption used by the WRS (currently 6.8 percent).

The City of Milwaukee may use no more than 90 percent of the annual revenue generated by the additional sales and use tax to pay the annual employer contributions toward the UAAL of its current pension system. Ten percent of the annual additional sales and use tax revenue must be used to maintain 2023 levels of law enforcement, fire protective and emergency medical service. Any further annual excess collected must be used to pay ongoing costs related to increased staffing levels of law enforcement officers and paid fire department staff.

Milwaukee County must use the annual revenue generated by the additional sales and use tax that is not used to pay the retirement system's annual employer contribution toward UAAL to repay its existing pension bond obligations. Any additional annual excess revenue collected through the additional sales and use tax authority must be used as an additional payment to the county retirement system's remaining UAAL.

In any year that the city or county does not make the required contributions to the UAAL of their respective retirement systems, the Department of Revenue (DOR) must reduce their respective shared revenue payment by the amount of the unpaid contribution and use the amount to pay toward the UAAL.

In any year that the city or county uses the additional sales and use tax revenues for a purpose not authorized under Assembly Bill 245, DOR must reduce their shared revenue payment by the amount of the unauthorized expenditure.

The additional sales tax authority authorized by the bill ceases for either the city or the county at the earlier of fully funding their respective retirement systems or after 30 years have elapsed since the effective date of the tax. Both the city and the county must submit annual reports to the Joint Committee on Finance detailing the expenditures of funds collected under the additional sales and use tax.

Actuarial Effect

These provisions will likely have a significant actuarial effect on the City of Milwaukee and Milwaukee County Employee Retirement Systems. While the effects of this specific provision were not fully studied by the consulting actuary (GRS Consulting), GRS reviewed existing actuarial assumptions for the City of Milwaukee and Milwaukee County, as well as their January 1, 2022 actuarial report and summary material of recent economic and demographic experience studies, and made projections based on specific scenarios requested by the Legislative Fiscal Bureau. Assuming that new hires for the city and county join the WRS after January 2024, the current annual investment return assumption used by the WRS (6.8 percent), and the 30-year amortization period required under Assembly Bill 245, the city's projected UAAL would be approximately \$2.3 billion. The county's projected UAAL would be approximately \$700 million using the same assumptions. In contrast, the same projections using the 7.5 percent return assumption currently used by the city and county would result in projected UAALs of \$1.61 billion and \$570 million, respectively, which is the same projection if no legislation was passed.

Probable Costs

Addressing current UAAL issues for the city and county will, necessarily, increase employer contributions under the provisions of their current systems. These increased costs are based on assumptions utilized. One way to represent the scale of the city and county UAAL issues is to represent UAAL in relation to total municipal payroll costs, recognizing that following referenda as authorized by the bill, new sales tax revenues would be available to address these liabilities. Assuming a 30-year amortization period, a 6.8 percent return assumption and new hires after 2024 joining the WRS, as proposed in the bill, the projected employer contribution cost for the City of Milwaukee would result in projected employer costs of 41.4 percent of payroll in 2024 to 23.0 percent of payroll in 2053. The same scenario for Milwaukee County would result in projected employer contribution costs of 30.8 percent of payroll in 2024 to 17.2 percent of payroll in 2053, utilizing the assumptions proposed in the bill.

For more information on the actuarial effects and potential costs generated by this provision and several other scenarios, please see the actuarial study attached to this report. Detailed annual cost projections under a variety of scenarios are available in Section D of the attached actuarial study. Summary results of projected cost scenarios may be found on page A-7.

Requiring Newly Hired City and County Employees of Certain City Agencies and Counties to be Enrolled in the WRS

Description

These provisions of 2023 Assembly Bill 245 require newly hired employees of the City of Milwaukee and Milwaukee County to participate in the WRS.

Under **current law**, the City of Milwaukee and Milwaukee County each operate their own employee pension systems, independent of the WRS.

2023 Assembly Bill 245 requires that the City of Milwaukee and Milwaukee County join the WRS following the imposition of the additional sales and use tax referenced above with respect to all new employees of the city and the county hired after December 31 of the year in which the city or county adopts the additional sales and use tax.

Actuarial Effect

Based on the analysis provided by GRS, for general and protective employees with Social Security coverage, the size of the new entrant group is expected to be small relative to the size of the WRS and is, therefore, unlikely to have any material impact on WRS normal cost rates, regardless of the employees' prospective ages at entry. For protective employees without Social Security coverage, the size of the group of potential entrants to the WRS is similar to those already participating in the WRS and "could potentially affect the total normal cost very gradually over time." GRS further indicates that because the average ages, lengths of service, salaries, and entry ages are "very similar" to the WRS, this is unlikely to change the normal cost significantly. Finally, GRS notes that because benefits and contributions are proportional to pay, the differences in average pay for Milwaukee employees is a neutral matter with respect to the WRS.

Probable Costs

As noted in the actuarial analysis presented above, this provision is not expected to materially increase costs to the WRS.

For more information on the actuarial effects and potential costs generated by this provision, see page A-8 of the actuarial study attached to this report.

POLICY RECOMMENDATION

On tie votes of Ayes, 5, Noes, 5, the Joint Survey Committee on Retirement Systems makes no recommendation regarding the desirability of the provisions of 2023 Assembly Bill 245, as they relate to the City of Milwaukee and Milwaukee County employee retirement systems, and the WRS.

ATTACHMENT

Analysis of Milwaukee Retirement Systems Closure and Entry Into the Wisconsin Retirement System



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March 31, 2023

Mr. Matt Stohr
Administrator -- Division of Retirement Services
Wisconsin D.E.T.F.
4822 Madison Yards Way
Madison, Wisconsin 53705

Dear Mr. Stohr:

Gabriel, Roeder, Smith & Company (GRS) is pleased to present this report related to the potential closure of the City of Milwaukee Employees' Retirement System and the Employees' Retirement System of the County of Milwaukee, and the potential for new hires from each System to enter the Wisconsin Retirement System on a prospective basis.

This report should not be relied on for any purpose other than those described above. It was prepared at the request of Wisconsin DETF and the Legislative Fiscal Bureau. It is intended for their use or by those designated or approved by Wisconsin DETF and the Legislative Fiscal Bureau. This report may be provided to other parties only in its entirety and only with the permission of Wisconsin DETF and the Legislative Fiscal Bureau. GRS is not responsible for unauthorized use of this report.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law.

This report 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 and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

This report does not include an assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment.

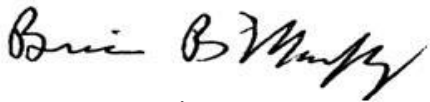
Users of this report must understand that we did not have access to full datasets for the two subject retirement systems. Our results, therefore, are necessarily based on approximations and judgment which limits their value to a certain extent. Results based upon a complete set of data would be different and could potentially lead to different judgments regarding the matters at issue.

Mr. Matt Stohr
March 31, 2023
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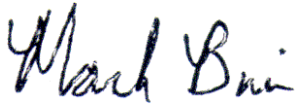
To the best of our knowledge this report is complete and accurate within the limits described above. All calculations have been made in conformity with generally accepted actuarial principles and practices and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. Brian B. Murphy, Mark Buis and James D. Anderson are all Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. The signing actuaries are independent of the plan sponsor.

GRS appreciatively acknowledges your efforts in gathering materials for this project.

Respectfully submitted,
Gabriel, Roeder, Smith & Company



Brian B. Murphy, FSA, EA, FCA, MAAA, PhD



Mark Buis, FSA, EA, FCA, MAAA



James D. Anderson, FSA, EA, FCA, MAAA

BBM/MB/JDA:rmn



SECTION A

EXECUTIVE SUMMARY

Executive Summary

Background

Gabriel, Roeder, Smith & Company (GRS) was asked to provide the following scope of work:

- Confirm Unfunded Actuarial Accrued Liability (UAAL) amounts for each of the Milwaukee City and County retirement systems
 - Determine the proportion of current UAAL that relates to actives vs. retirees
- Provide recommendations on the best approach (i.e., amortize over 10, 20, or 30 years or pay as you go) to pay the unfunded liability once the amount is confirmed and a revenue source (sales tax) is secured
- Review soft close projections from Segal and Cavanaugh Macdonald (provided by ETF)
- Provide a comparison chart with the following elements, highlighting and explaining sources of cost differences (Example chart below):

Measure	Milwaukee Status Quo (No Legislation)	Milwaukee New Hires into WRS after 1/24, Assumed Rate of Return 7.5%	Milwaukee New Hires into WRS after 1/24, Assumed WRS Rate of Return 6.8%
Projected Rates			
Projected Normal Cost			
Projected UAAL			

- The Legislative Fiscal Bureau requested the following figures for each of the scenarios:
 - (1) An amortization schedule of UAAL payments (for the Milwaukee plans)
 - (2) Projected annual normal cost payments (for the Milwaukee plans)
 - (3) Projected annual employee contributions (for the Milwaukee plans)
 - (4) Projected annual employer and employee WRS contributions

Confirmation of Unfunded Actuarial Accrued Liability

For both the City and the County, GRS reviewed existing actuarial assumptions, the January 1, 2022 actuarial reports and summary material of recent economic and demographic experience studies. Observations from this review include:

- Demographic assumptions are generally reasonable for both Systems
- Economic assumptions are generally reasonable for both Systems, but we would prefer a lower discount rate assumption due to large negative cash flows for each System (contributions minus benefit payments) and the related fact that:
 - Retiree liabilities comprise 74% of the total actuarial accrued liabilities for the City
 - Retiree liabilities comprise 81% of the total actuarial accrued liabilities for the County

- We estimated liabilities at 6.8% discount and adjusted them approximately to reflect the revised assumptions in the recent experience studies:
 - At 6.8% discount and using new assumptions
 - The City accrued liability becomes approximately \$7.5 Billion, inclusive of retiree liabilities equaling approximately \$5.6 Billion – versus market assets of \$6.4 Billion at January 1, 2022.
 - The County accrued liability becomes approximately \$2.4 Billion, inclusive of retiree liabilities equaling approximately \$2.0 Billion – versus market assets of \$1.97 Billion at December 31, 2021.
 - At January 1, 2022 -- This means that essentially all of the assets (at actuarial value for the City, at market value for the County) are needed to cover retiree liabilities and that essentially all of the unfunded liability is for current active members.
 - At December 31, 2022 -- Calendar 2022 asset returns were negative for the vast majority of Retirement Systems, further eroding the funded status. It is likely that as of December 31, 2022 all or nearly all of the assets would be needed to cover retiree liabilities in both systems.
 - For reference: a November 2022 Flash report for the County indicates Market value assets of \$1.7 Billion as of November 30, 2022 which could mean that part of the County retiree liabilities could actually be unfunded as of December 31, 2022.

Impact of Plan Closure on Unfunded Actuarial Accrued Liability

If the plans close to new hires we would suggest that the investment consultant review the asset allocation with the closure in mind and that the actuary reconsider the actuarial assumptions and the actuarial cost method.

Regarding the actuarial assumptions, in some very rudimentary modelling that we have done (that was not specific to the instant situation), we have found that when a plan is closed, the discount rate should be reduced by something on the order of 100 to 200 basis points from the discount rate that would apply to a similarly situated open plan. This is because the asset allocation cannot be assumed to remain constant over the remaining life of the plan. As benefit payments increase relative to the asset pool, an ever-larger portion of the assets must inevitably be held in low risk liquid investments if benefit payments are not to be put at risk.

In the chart below, we selected the SWIB 6.80% return assumption as the standard basis and present very rough estimates of the accrued liabilities of both systems at 4.80%, 5.80% and 6.80%. The figures shown are intended to approximate results based upon the most recent experience studies of the two systems. Since we do not have access to full data sets we have used approximation techniques to prepare these figures. In our judgment the figures provide reasonable measures of the magnitude and direction of the effect of the illustrated discount rate changes on the liabilities, but the results could differ greatly from results that would be obtained from a complete actuarial valuation.

Discount Rate	Estimated Results at January 1, 2022 After Experience Study (\$ Millions)			Assets
	Actuarial Accrued Liabilities			
	4.80%	5.80%	6.80%	
City	\$9,769.5	\$8,505.7	\$7,501.7	\$5,673.8
County	\$3,082.9	\$2,715.2	\$2,432.7	\$1,763.5

Regarding the actuarial cost method, both plans currently use the Entry Age Actuarial cost method. This method bases the normal cost on the imputed characteristics of hypothetical new hires and then backs into the accrued liability. Since in a closed plan there will be no new hires, this method would not be our preferred method for valuation if the plans are indeed closed. We would instead suggest that the plan's actuary consider whether or not the projected unit credit actuarial cost method might be more suitable than the entry age method for developing the plan's liabilities. Since most of the liabilities are for retirees, this would result in a relatively small percentage change to total liabilities -- probably downward. We think that it may provide a more accurate reflection of emerging liabilities.

Considering both the discount rate assumption and the actuarial cost method, we think that expressing the liabilities initially using a Low Default Risk Obligation Measure such as described in ASOP 4 may be an appropriate exercise.

It is a common misconception that once the unfunded accrued liability is fully funded (when plan assets equal or exceed the accrued liability), the benefit obligation has been settled and contributions can cease. However, funding is still required for the accrual of benefits by continuing active members (the Normal Cost) and importantly, the unfunded liability is a fluid number that will change from year to year based on market experience. Suppose, for example that the City fully paid off the existing unfunded liability 10 years from today or even today. If the fund assets were to have a poor year or two and return negative 20%, the plan would revert to 80% funded status and new unfunded liability would need to be paid off leading to a need for additional contributions. For that reason, closed plans often look for risk mitigation strategies to either:

- Match movement in plan assets and plan liabilities to each other ("liability matching"); or
- Transfer all or a portion of the liabilities to a third party -- for example by purchasing annuities.

Over the past 10 years, the low interest rate environment made the strategies above very difficult to accomplish since doing so would have been cost prohibitive. However, with the recent uptick in interest rates and fixed income yields, there may be new opportunities to immunize against adverse investment risk. If the plan is closed we recommend that such opportunities be explored.

Recommendation on Financing Approach for Unfunded Liability

The Milwaukee plans currently use a version of level percent of pay amortization of unfunded liabilities -- this means that the dollar contribution for unfunded liabilities is expected to increase each year at the rate that City payroll (2.00%) or County revenue (1.75%) is expected to grow.

Once closed to new hires, the plans' covered payroll will eventually begin to decline, and level percent of payroll amortization becomes impractical to implement. We think the first step following closure is really to reassess the unfunded liability based upon a discount rate and actuarial cost method targeted to the closed plan. Once that is done, options for amortization of the unfunded liabilities include:

- Using Level Dollar amortization of UAAL or contributions increasing at a stated rate based upon expected availability of resources; for example, the 2.00% and 1.75% rates above might be reasonable, although we would prefer strict level dollar.
- Using an amortization method that front loads contributions; one choice would be level principal declining interest.

Best practices generally call for accelerated funding in a closed plan, which is likely to increase plan sponsor contributions near term.

City Pension Financing Recommendation

- Transition from the "Stable Contribution Rate Policy" to making full actuarial determined contributions as rapidly as possible, ideally immediately.
- Finance the unfunded liability at closure over the present remaining funding period.
- Finance all new liability arising after plan closure using 15-year closed layered level dollar amortization.
- Consider shortening the 15-year period above in steps as the plan winds up.
- Perform regular projections and stress tests to ensure that funding is sufficient to pay benefits in a timely manner and that risk mitigation is sufficient.
- Re-assess the funding policy and actuarial assumptions on a regular schedule.
- Watch for opportunities to reduce risk, purchase annuities, or otherwise to spin off liabilities.

County Pension Financing Recommendation

- Finance the unfunded liability at closure over the present remaining funding period.
- Finance all new liability arising after plan closure using 15-year closed layered level dollar amortization.
- Consider shortening the 15-year period above in steps as the plan winds up.
- Perform regular projections and stress tests to ensure that funding is sufficient to pay benefits in a timely manner and that risk mitigation is sufficient.
- Re-assess the funding policy and actuarial assumptions on a regular schedule.
- Watch for opportunities to reduce risk, purchase annuities, or otherwise to spin off liabilities.

Review of Soft Close Projections by Segal and Cavanaugh Macdonald

In general, we found that the projections for Milwaukee City (conducted by Cavanaugh Macdonald) and Milwaukee County (conducted by Segal) provided projection results that were internally consistent and accurate. We note that the Cavanaugh Macdonald report did not provide a ‘Baseline’ scenario, stating “We believe this comparison would have limited value at this time”. As an outside reader, this made it difficult to form an opinion regarding the overall cost impact. We also note that the Segal report did not disclose the basis for the Milwaukee County Unfunded Actuarial Accrued Liability (UAAL) in the baseline scenario (an amount of \$474.47 million). The January 1, 2022 valuation report reported the unfunded liability to be \$537.7 million on an actuarial value of assets basis and \$330.9 million on a market value basis. We note there may have been additional detail in a prior report. The firms used different methodologies, assumptions, metrics and scenarios in their respective analyses which made comparing the impact for each system difficult. The following table summarizes these differences and provides the approach GRS used for consolidation.

	Milwaukee City (CavMac)	Milwaukee County (Segal)	Current Study (GRS)
Liability	Present Value of Projected Benefits (PVFB)	Entry Age Actuarial Accrued Liability (AAL)	Entry Age Actuarial Accrued Liability (AAL)
Assets Value Used	Market Value (MV)	Actuarial Value Assets (AVA)	Market Value (MV)
UAAL Definition	PVFB + Expenses - EE cont - MV	AAL - AVA	AAL - MV
Amortization of UAAL	30, 20 years	10 years	30, 20, 10 Years
Projection Start Date	January 1, 2023	January 1, 2023	January 1, 2024
Wage Inflation	3.0%	3.5%	3.0%
Scenarios	Proposed Scenario only with different Amortization Periods	5 Scenarios (including baseline)	Baseline, Proposed Change at 7.5% Proposed Change at 6.8%
Projection Metrics	Total Cost, ERS and WRS breakout	Normal Cost, Member Rate, UAAL Payment Total Cost, ERS and WRS breakouts	ERS Amortization, ERS ER Normal Cost, ERS, EE Cont, WRS EE+ER Cont

Comparison Chart of Costs

Section D of this report develops summary charts of projected UAAL payments (10, 20 and 30 years), Employer Normal Cost and Employee contributions under the requested scenarios for Milwaukee City and County separately. Below is a consolidated summary of these results which combines both Milwaukee plans. **Please note that for the Status Quo column, for consistency in comparing disparate results from the actuaries for the City and County (as noted on the previous page), we amortized the existing unfunded liability over 30, 20 and 10 year periods instead of the current funding policies of Milwaukee City and County.** We also estimated the unfunded liability as of January 1, 2024 based on estimated accrued liability and a Market Value of Assets that considers the unfavorable investment performance of 2022 and projecting with the assumed interest rate thereafter.

The 'first year rate' shown below is the rate in 2024. The 'ultimate rate' is the rate that would occur after all post-2023 Milwaukee hires are active members in the WRS plan (approximately 40 years). The projections are based on all assumptions being met, including receipt of all required employer and employee contributions during the period. While these spot rates are helpful from a comparison standpoint, additional detail showing how the rates change over time are provided in the complete projection summaries in Section D of this report.

Observations on Summary Charts Below

Scenario 1: Milwaukee Status Quo (No Legislation)

Milwaukee continues having stand-alone plans. The Projected ER contributions shown below are based on a unified amortization approach.

Scenario 2: Milwaukee New Hires into WRS after 1/2024, Assumed Rate of Return 7.5% for Milwaukee

The first year ER and EE contribution rates, Normal Costs, and UAAL are unchanged, since no new hires have occurred, and the interest rate applied to Milwaukee plans remains 7.5%. The ultimate ER contribution rate reflects amortization of legacy liabilities and movement of all new hires into WRS and valued using 6.8% assumed rate of return.

Scenario 3: Milwaukee New Hires into WRS after 1/2024, Assumed Rate of Return 6.8% for Milwaukee

In all cases, the percentages are expressed as percentages of the total payroll of the entity combining both payroll covered by the closed system and payroll potentially covered by the Wisconsin Retirement System. The first year ER and EE contribution rates, Normal Costs, and UAAL all increase from the valuation figures. While no new hires have occurred, the interest rate applied to Milwaukee plans changed to 6.8%. The ultimate ER contribution rate reflects amortization of legacy liabilities and movement of all new hires into WRS and valued using 6.8% assumed rate of return.

Scenario 4: Milwaukee New Hires into WRS after 1/2024, Assumed Rate of Return 5.8% for Milwaukee

This scenario has been added on the following page at the request of the Legislative Fiscal Bureau.



Summary of Results using 30-Year Amortization of UAAL

	Scenario 1 Milwaukee Status Quo (No Legislation)		Scenario 2 Milwaukee New Hires into WRS after 1/24, Assumed Rate of Return 7.5%*		Scenario 3 Milwaukee New Hires into WRS after 1/24, Assumed Rate of Return 6.8%		Scenario 4 Milwaukee New Hires into WRS after 1/24, Assumed Rate of Return 5.8%	
	<u>City</u>	<u>County</u>	<u>City</u>	<u>County</u>	<u>City</u>	<u>County</u>	<u>City</u>	<u>County</u>
Projected ER Contribution								
First Year Rate	31.4%	25.2%	31.4%	25.2%	41.4%	30.8%	55.3%	39.5%
Ultimate Rate	10.0%	4.7%	10.9%	7.3%	10.9%	7.3%	10.9%	7.4%
Projected EE Contribution								
First Year Rate	5.6%	4.7%	5.6%	4.7%	5.6%	5.5%	5.6%	6.8%
Ultimate Rate	5.6%	4.7%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%
Projected Normal Cost								
First Year Rate	15.6%	9.3%	15.6%	9.3%	18.2%	10.9%	22.8%	13.7%
Ultimate Rate	15.6%	9.3%	17.7%	14.1%	17.7%	14.1%	17.7%	14.2%
Projected UAAL								
As of 1/1/2024 based on MV	\$1.61 Billion	\$0.57 Billion	\$1.61 Billion	\$0.57 Billion	\$2.31 Billion	\$0.70 Billion	\$3.39 Billion	\$1.00 Billion

* 7.5% Assumed for closed Milwaukee plans, WRS plans valued at 6.8%

Summary of Results using 20-Year Amortization of UAAL

	Scenario 1 Milwaukee Status Quo (No Legislation)		Scenario 2 Milwaukee New Hires into WRS after 1/24, Assumed Rate of Return 7.5%*		Scenario 3 Milwaukee New Hires into WRS after 1/24, Assumed Rate of Return 6.8%		Scenario 4 Milwaukee New Hires into WRS after 1/24, Assumed Rate of Return 5.8%	
	<u>City</u>	<u>County</u>	<u>City</u>	<u>County</u>	<u>City</u>	<u>County</u>	<u>City</u>	<u>County</u>
Projected ER Contribution								
First Year Rate	34.8%	28.8%	34.8%	28.8%	46.4%	35.3%	63.2%	46.2%
Ultimate Rate	10.0%	4.7%	10.9%	7.3%	10.9%	7.3%	10.9%	7.4%
Projected EE Contribution								
First Year Rate	5.6%	4.7%	5.6%	4.7%	5.6%	5.5%	5.6%	6.8%
Ultimate Rate	5.6%	4.7%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%
Projected Normal Cost								
First Year Rate	15.6%	9.3%	15.6%	9.3%	18.2%	10.9%	22.8%	13.7%
Ultimate Rate	15.6%	9.3%	17.7%	14.1%	17.7%	14.1%	17.7%	14.2%
Projected UAAL								
as of 1/1/2024 based on MV	\$1.61 Billion	\$0.57 Billion	\$1.61 Billion	\$0.57 Billion	\$2.31 Billion	\$0.70 Billion	\$3.39 Billion	\$1.00 Billion

* 7.5% Assumed for closed Milwaukee plans, WRS plans valued at 6.8%

Summary of Results using 10-Year Amortization of UAAL

	Scenario 1 Milwaukee Status Quo (No Legislation)		Scenario 2 Milwaukee New Hires into WRS after 1/24, Assumed Rate of Return 7.5%*		Scenario 3 Milwaukee New Hires into WRS after 1/24, Assumed Rate of Return 6.8%		Scenario 4 Milwaukee New Hires into WRS after 1/24, Assumed Rate of Return 5.8%	
	<u>City</u>	<u>County</u>	<u>City</u>	<u>County</u>	<u>City</u>	<u>County</u>	<u>City</u>	<u>County</u>
Projected ER Contribution								
First Year Rate	46.8%	41.3%	46.8%	41.3%	63.9%	50.8%	89.3%	68.7%
Ultimate Rate	10.0%	4.7%	10.9%	7.3%	10.9%	7.3%	10.9%	7.4%
Projected EE Contribution								
First Year Rate	5.6%	4.7%	5.6%	4.7%	5.6%	5.5%	5.6%	6.8%
Ultimate Rate	5.6%	4.7%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%
Projected Normal Cost								
First Year Rate	15.6%	9.3%	15.6%	9.3%	18.2%	10.9%	22.8%	13.7%
Ultimate Rate	15.6%	9.3%	17.7%	14.1%	17.7%	14.1%	17.7%	14.2%
Projected UAAL								
as of 1/1/2024 based on MV	\$1.61 Billion	\$0.57 Billion	\$1.61 Billion	\$0.57 Billion	\$2.31 Billion	\$0.70 Billion	\$3.39 Billion	\$1.00 Billion

* 7.5% Assumed for closed Milwaukee plans, WRS plans valued at 6.8%



Executive Summary

Determine Any Potential Impacts to the WRS

In general, when new entrants enter the WRS on a prospective basis, there is very little impact to the costs of WRS. New entrants arrive and WRS receives the associated employer and employee contributions. If, however, the demographics of the new entrants is significantly different than the demographics of WRS, this could ultimately shift the normal cost rate. Below is a summary of the January 1, 2022 census of active participants for WRS compared to Milwaukee City and County Plans.

General Employees	Milwaukee City	Milwaukee County	WRS
Count	7,768	3,060	234,494
Average Age	46.9	45.2	45.0
Average Service	10.4	9.4	11.1
Average Entry Age	36.5	35.8	33.9
Average Salary	\$47,500	\$60,000	\$58,179

Protective with Social Security	Milwaukee County	WRS
Count	265	19,175
Average Age	39.4	39.7
Average Service	12.1	12.0
Average Entry Age	27.3	27.7
Average Salary	\$70,228	\$80,525

Protective without Social Security	Milwaukee City	WRS
Count	2,326	2,762
Average Age	39.8	40.4
Average Service	13.1	13.5
Average Entry Age	26.7	26.9
Average Salary	\$90,342	\$99,281

For General and Protective with Social Security groups, the ultimate size of the new entrant group (in 30 to 40 years), is very small in relation to the WRS and is unlikely to have any material impact on normal cost rates, regardless of prospective ages at plan entry.

For the Protective without Social Security group, the ultimate size of Milwaukee City public safety participants is somewhat similar to the WRS and could potentially affect the total normal cost very gradually over time. However, the average age, average service and average salary for Milwaukee City is very similar to corresponding figures for WRS participants. Given that new entrants would enter the WRS with a very similar entry age, this is unlikely to change the normal cost rate significantly.

We note that with the exception of County General employees, the average pay for Milwaukee employees is well below the WRS average. Since benefits and contributions are both proportional to pay, we think that this is a neutral matter with respect to the WRS.

SECTION B

AUDIT OF UNFUNDED ACTUARIAL ACCRUED LIABILITY

Unfunded Liability – Milwaukee City

Executive Summary

We have reviewed the existing actuarial assumptions, the January 1, 2022 actuarial report and the material presented in two PowerPoints that summarized recent economic and demographic experience studies. The PowerPoints were dated August 24, 2022 and September 28, 2022 respectively. We also reviewed the report of the phase 1 Asset Liability study performed by the Callan firm and dated February 9, 2023. We think that the demographic assumptions are generally reasonable, although left to our own devices we would use different assumptions than the retained actuary for mortality and certain other decrement rates. We think that the economic assumptions are also reasonable, but we would prefer a lower discount rate assumption due to the large negative cash flows and the related fact that 74% of the liabilities are for retirees.

The January 1, 2022 Valuation prepared by the retained actuaries presents the following information regarding the unfunded accrued liability at various discount rates.

Current Demographic Assumptions	January 1, 2022 Valuation Combined Fund (\$000)		
	6.50%	7.00%	7.50%
Actuarial Value of Assets	\$5,673,797	\$5,673,797	\$5,673,797
Actuarial Accrued Liability	\$7,679,982	\$7,253,004	\$6,864,666
Unfunded Accrued liability	\$2,006,185	\$1,579,207	\$1,190,869

We made an estimate of liabilities at 6.8% discount and adjusted it approximately to reflect the revised assumptions in the recent experience study. The result of that estimate is that the accrued liability would become approximately \$7.5 Billion with the new assumptions and 6.8% discount. The retiree liabilities would increase to approximately \$5.6 Billion. This means that essentially all of the assets (at actuarial value) are needed to cover retiree liabilities and that essentially all of the unfunded liability is for current active members. The assets are sufficient to cover the retiree liabilities at 6.8% discount. The market value of assets is actually \$6.4 Billion at January 1, 2022, but of course it is quite likely that at the time of this writing market value of assets is below that level.

If the plan is closed to new hires, we would suggest that the investment consultant review the asset allocation with that in mind and that the actuary reconsider the actuarial assumptions and the actuarial cost method. We suggest that the Projected Unit Credit (PUC) method is more consistent with the accrual of benefits in a closed plan than the entry age normal method. Since the vast majority of liabilities are for retirees, the change to PUC would not have a large effect on liabilities. We would also prefer to express the liabilities using a Low Default Risk Obligation Measure.

Detailed Analysis of Assumptions and UAAL

The combined fund is 99% of the total as evidenced by the following directly excerpted chart from the January 1, 2022 actuarial valuation. Consequently, most of our analysis focuses on the combined fund.

(\$ in thousands)

Fund	Market Value	Actuarial Value
1. Combined Fund	\$ 6,367,898	\$ 5,673,797
2. Employers' Reserve Fund	\$ 42,081	\$ 42,081
3. Retirement Fund	\$ 13,433	\$ 11,969
4. General Employees' Duty Disability Fund	\$ 122	\$ 109
5. Fire & Police Duty Disability Fund	\$ 0	\$ 0
6. Firemen's Heart & Lung Fund	\$ 0	\$ 0
7. Combined Retirement & Disability Fund	\$ 7,267	\$ 6,475
8. Securities Lending Fund	\$ 555	\$ 555
9. Total All Funds	\$ 6,431,356	\$ 5,734,986

Information presented elsewhere in the actuarial report indicates that retiree liabilities are \$5.1 Billion and therefore 74% of total actuarial accrued liabilities as of January 1, 2022. That is a much higher ratio than we typically see. The following chart is based upon data in the actuarial report. It shows the cash flows associated with the Combined Fund.

Combined Fund	
Market Value January 1, 2021	\$5,597,607,000
Contributions	
Member	\$31,435,000
Employer	\$82,960,000
Total	\$114,395,000
Disbursements	
Annuities	\$441,005,000
Refunds	\$4,116,000
Admin Expenses	\$5,935,000
Total	\$451,056,000
Net External Cash Flow	-\$336,661,000
Net Investment Return	\$1,106,952,000
Market Value December 31, 2021	\$6,367,898,000
Contributions as a % of Assets	2.0%
Disbursements as % of Assets	8.1%
Net External Cash Flow	-6.1%

Negative Net External Cash Flow at a level of 6.1% in a plan whose liabilities are 74% in payment status is a leading indicator of potential exhaustion of assets. Contribution rates are expected to nearly double in the near future as a consequence of the stabilization policy. The increased contributions required by the stabilization policy, if made, would help preserve the integrity of the fund. Under these conditions it is important that the assumptions upon which the liabilities and contributions are based be carefully reviewed, and that increased contributions are received as scheduled.

Economic Assumptions

In this section of the report, we present our analysis of the Economic and Demographic Assumptions Studies that the retained actuary used to calculate the unfunded liability of the retirement system. The assumptions are the basis (i.e., rationale) for the calculation of the actuarial accrued liability, and, therefore, of the unfunded liability. Actuarial assumptions must comply with the following:

- (1) Actuarial Standards of Practice (ASOP) No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*; and
- (2) ASOP No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*.

In addition to reviewing the assumptions for compliance with the above, we will compare them with assumptions in use by other governmental plans.

The items reviewed in connection with this part of our analysis include and are limited to:

- An Actuarial Valuation of the retirement system as of January 1, 2022 and dated May 26, 2022 signed by Larry Langer and Patrice Beckham of Cavanaugh Macdonald Consulting LLC

The above report references a five-year experience study that was completed in 2018. A copy of that study was not available to us.

The actuarial assumptions setting process is a combination of art and science. An actuary's professional judgment is a key component in the assumption setting process. Different actuarial consulting firms, and different actuaries within the same firm, may have significantly different thoughts on how some assumptions should be developed. Our analysis will not focus on minor differences in judgment items, but rather only on issues that could materially affect the assessment of the unfunded actuarial accrued liability.

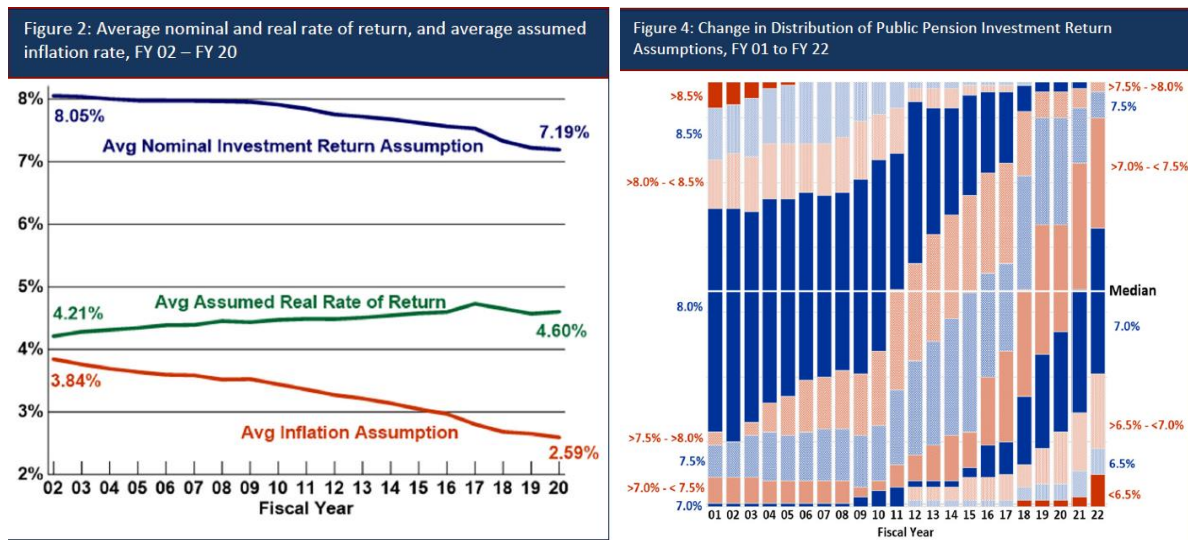
Economic Assumptions

The economic assumptions used in the January 2022 valuation were as follows:

- Inflation: 2.5%
- Investment Return: 7.5%
- Cost of Living Adjustments: 2.5% for retirees whose COLA is the lesser of 3% and CPI-U
- Salary Increase Rates: Table by Age and Occupation
- Payroll Growth: 2% -- the rate of increase of UAAL payments

Peer Comparison

The charts below are taken from the NASRA March 2022 Issue Brief “Public Pension Plan Investment Return Assumptions”.



Actuarial assumptions cannot and should not be judged based upon a peer comparison, but assumptions deviating materially from the peer universe may require special scrutiny. The charts do suggest that the 2.5% inflation assumption is mainstream, but they also suggest that the 7.5% investment return assumption is in the minority.

Guidance regarding the selection of economic assumptions for measuring pension obligations is provided by ASOP No. 27. The standard requires that the selected economic assumptions be consistent with each other. That is, the selection of the investment return assumption should be consistent with the selection of the wage inflation and price inflation assumptions.

ASOP No. 27 (applicable to valuation dates on or after August 1, 2021) defines a reasonable economic assumption as an assumption that has the following characteristics:

1. It is appropriate for the purpose of the measurement;
2. It reflects the actuary’s professional judgment;
3. It considers historical and current economic data that is relevant as of the measurement date;
4. It reflects the actuary’s estimate of future experience, the actuary’s observation of the estimates inherent in market data (if any), or a combination thereof; and
5. It has no significant bias (i.e., it is not significantly optimistic or pessimistic), except when provisions for adverse deviation or plan provisions that are difficult to measure are included and disclosed or when alternative assumptions are used for the assessment of risk.

In selecting economic assumptions, the actuary relies on many different experts (e.g., investment consultants) for data and analysis. However, as required by ASOP No. 27, “When the actuary is responsible for selecting or giving advice on selecting economic assumptions within the scope of this standard, the actuary may incorporate the views of experts but the selection or advice should reflect the actuary’s professional judgment.”

Price Inflation

Price inflation underlies both the wage inflation and investment return assumptions.

Sources of data that GRS generally consider in the analysis of the price inflation assumption include:

1. Inflation expectations of various Federal Reserve Banks (e.g., Cleveland, St. Louis)
2. Philadelphia Federal Reserve quarterly survey of Society of Professional Forecasters
3. Comparison of Treasury yields and Treasury Inflation Protected Securities (TIPS)
4. Future expectations of the plan's investment consultant and other investment consultants that GRS monitors

Presented on the following page are forward-looking price inflation forecasts that GRS monitors to assist in developing the price inflation assumption.

Forward-Looking Price Inflation Forecasts^a	
Congressional Budget Office^b	
5-Year Annual Average	3.23%
10-Year Annual Average	2.81%
Federal Reserve Bank of Philadelphia^c	
5-Year Annual Average	3.75%
10-Year Annual Average	2.95%
Federal Reserve Bank of Cleveland^d	
10-Year Expectation	2.22%
20-Year Expectation	2.29%
30-Year Expectation	2.37%
Federal Reserve Bank of St. Louis^e	
10-Year Breakeven Inflation	2.26%
20-Year Breakeven Inflation	2.50%
30-Year Breakeven Inflation	2.26%
U.S. Department of the Treasury^f	
10-Year Breakeven Inflation	2.07%
20-Year Breakeven Inflation	2.40%
30-Year Breakeven Inflation	2.21%
50-Year Breakeven Inflation	2.34%
100-Year Breakeven Inflation	2.44%
Social Security Trustees^g	
Ultimate Intermediate Assumption	2.40%

^a**End of the Fourth Quarter, 2022.** Version 2023-02-09 by Gabriel, Roeder, Smith & Company.

^b*The Budget and Economic Outlook: 2022 to 2032*, Release Date: May 2022, Consumer Price Index (CPI-U), Percentage Change from Year to Year, 5-Year Annual Average (2022 - 2026), 10-Year Annual Average (2022 - 2031).

^c*Fourth Quarter 2022 Survey of Professional Forecasters*, Release Date: November 14, 2022, Headline CPI, Annualized Percentage Points, 5-Year Annual Average (2022 - 2026), 10-Year Annual Average (2022 - 2031).

^dInflation Expectations, Model output date: December 1, 2022.

^eThe breakeven inflation rate represents a measure of expected inflation derived from X-Year Treasury Constant Maturity Securities and X-Year Treasury Inflation-Indexed Constant Maturity Securities. Observation date: December, 2022.

^fThe Treasury Breakeven Inflation (TBI) Curve, Monthly Average Rates, December, 2022.

^g*The 2022 Annual Report of The Board of Trustees of The Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds*, June 2, 2022, Long-range (75-year) assumptions, Intermediate, Consumer Price Index (CPI-W), for 2026 and later.

In addition to the information in the chart, it is important to recognize that the Federal Reserve targets 2% inflation as measured by the Personal Consumption Expenditures (PCE) index and is taking aggressive action to bring inflation back to the 2% area.

Based on this information, we conclude that an inflation assumption of 2.5% is reasonable. We note that in the Phase 1 report of the asset allocation study prepared by the Callan firm, the investment consultant is basing its work on a 2.5% assumption for 10 years and a 2.35% assumption for 30 years.

Investment Return

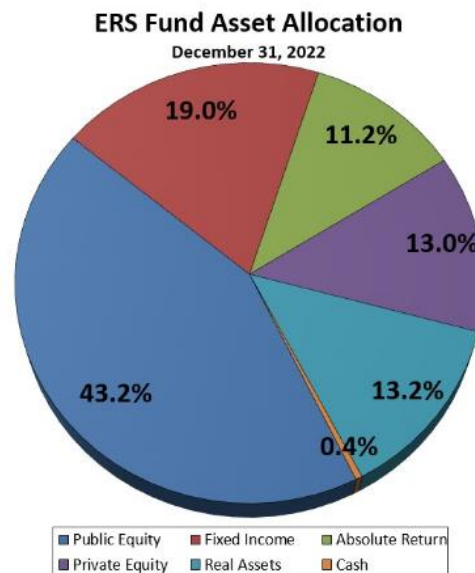
ASOP 27 says the following specifically regarding the investment return assumption:

3.8.3 Measurement-Specific Considerations—The actuary should take into account factors specific to each measurement in selecting an investment return assumption.

Such factors may include the following:

- a. Investment Policy—The plan’s investment policy may include the following: (i) the current allocation of the plan’s assets...

The actuarial valuation report contained no information about the plan’s investment policy or asset allocation. Fortunately, we were able to locate the following on the Retirement System website.



There is often great temptation to look to the past to test investment return assumptions. We do find the past interesting, and note the following chart from the valuation report.

Year	Actuarial Value of Assets	Market Value of Assets
2004	9.49%	12.61%
2005	15.34%	8.46%
2006	11.83%	15.13%
2007	10.17%	7.21%
2008	(17.88%)	(30.84%)
2009	22.62%	23.30%
2010	1.34%	13.86%
2011	(0.09%)	(1.43%)
2012	0.43%	13.88%
2013	12.85%	19.29%
2014	9.91%	5.09%
2015	7.00%	0.54%
2016	8.33%	8.83%
2017	9.09%	16.38%
2018	5.33%	(2.91%)
2019	6.94%	18.44%
2020	9.22%	6.62%
Average*	6.83%	7.11%
Max	22.62%	23.30%
Min	(17.88%)	(30.84%)
Range	40.50%	54.14%

Most actuaries, including as far as we know, the retained actuaries, agree that actuarial assumptions, and, in particular, the investment return assumption must be forward looking. They are intended to be estimates of how the future may unfold, not of what happened in the past.

Our comments are based on expected returns from a portfolio with the same asset allocation as that of the retirement system. Because GRS is a benefits consulting firm, it does not develop or maintain its own capital market expectations. Instead, we monitor forward-looking expectations developed by several major investment consulting firms and maintain them in a tool that we refer to as the Capital Market Assumption Modeler (“CMAM”).

Our 2022 CMAM is based upon capital market assumptions from the first quarter of 2022. We are aware that capital market assumptions have generally increased since that time. Twelve Investment Firms in our database provide Capital Market Assumptions over a 10-year horizon. Six of those firms also provide Capital Market Assumptions over a 20-30-year horizon. The results over a 10-year horizon are in the chart below.

GRS 2022 CMAM				
Capital Market Assumption Set (CMA)	Distribution of 10-Year Average Geometric Net Nominal Return			Probability of exceeding 7.50%
	40th	50th	60th	
(1)	(2)	(3)	(4)	(5)
1	3.93%	4.90%	5.88%	25.21%
2	4.00%	5.02%	6.05%	27.32%
3	4.10%	5.11%	6.12%	27.66%
4	4.34%	5.26%	6.19%	27.24%
5	4.37%	5.41%	6.45%	30.68%
6	4.55%	5.44%	6.34%	28.20%
7	4.71%	5.80%	6.90%	34.79%
8	4.78%	5.82%	6.86%	34.25%
9	4.91%	5.96%	7.01%	35.61%
10	5.05%	6.04%	7.04%	35.59%
11	5.73%	6.72%	7.73%	42.24%
12	6.05%	7.18%	8.31%	47.12%
Average	4.71%	5.72%	6.74%	32.99%

Our tool indicates further that over a 20-30-year horizon, the 50th percentile of return is 6.86%. This suggests to us that the assumed return is aggressive for a January 1, 2022 valuation. However, we are aware that capital market assumptions have increased materially since our tool was last updated.

The Callan firm is currently preparing an asset allocation study for CMERS. The Phase 1 report of the study reviews the current target and a number of alternatives. The median expectation for the current target according to the study is 7.05% over 10 years and 7.55% over 30 years.

Given the high negative external cash flows and the fact that 74% of the liabilities are in pay status, we are much more comfortable with a return expectation in the 7% area or below than we are with the current 7.5% assumption. In particular, if the retirement system is ever closed to new entrants, we would prefer an assumption well below 7%.

We have done some very rudimentary modeling of the operation of a closed plan (not based on the instant situation) which suggests that when a plan is closed the discount rate assumption should be below the assumption applicable to a similarly situated open plan by an amount, perhaps on the order of 100 to 200 basis points. This is because in a closed plan, it is not reasonable to assume that the asset allocation can be held constant indefinitely.

We note that Table 32 on page 55 of the valuation provides results at both 7% and 6.5%. This will allow us, by interpolation, to estimate the effect of a lesser discount rate.

Cost of Living Adjustment (COLA)

Given the inflation assumption of 2.5% an assumed cost of living adjustment for groups whose COLA is the lesser of 3% and CPI is certainly reasonable.

Salary Increase Rates

Age	Salary Increases	
	General Employees	Firemen and Policemen
25	4.93%	9.47%
30	3.79	7.72
35	3.78	5.78
40	2.89	4.68
45	2.50	4.28
50	2.50	4.08
55	2.50	4.00
60	2.50	4.00
65	2.50	4.00

In order to assess the salary increase assumption we reviewed the data summaries beginning on page 58 of the valuation report. We calculated the average pay by age bracket and then calculated the average 5-year increase for each bracket. We then compared those increases to the assumed increases shown above after first subtracting 2.5% from the General increases and 4% from the Police and Fire Increases. The results are shown on the following page.

Police and Fire Pay Increases

Age Group	No.	Total Payroll	Average	Merit and Longevity Increase	
				Actual	Assumed
24 & Under	127	\$5,969,491	\$47,004	n/a	n/a
25-29	271	\$18,205,467	\$67,179	7.40%	5.47%
30-34	338	\$24,483,501	\$72,436	1.52%	3.72%
35-39	443	\$36,589,568	\$82,595	2.66%	1.78%
40-44	411	\$35,740,931	\$86,961	1.04%	0.68%
45-49	422	\$38,218,238	\$90,565	0.82%	0.28%
50-54	306	\$28,707,585	\$93,816	0.71%	0.08%
55-59	89	\$8,115,146	\$91,181	-0.57%	0.00%
60-64	23	\$2,036,405	\$88,539	-0.59%	0.00%
65 & up	2	\$216,196	\$108,098	4.07%	0.00%
	2432	\$198,282,528			

General Employees (Tier1+Tier2)

Age Group	No.	Total Payroll	Average	Merit and Longevity Increase	
				Actual	Assumed
24 & Under	167	\$3,318,282	\$19,870	n/a	n/a
25-29	582	\$16,407,702	\$28,192	7.25%	2.43%
30-34	826	\$28,332,634	\$34,301	4.00%	1.29%
35-39	892	\$36,743,789	\$41,193	3.73%	1.28%
40-44	980	\$42,845,126	\$43,720	1.20%	0.39%
45-49	941	\$41,991,544	\$44,624	0.41%	0.00%
50-54	1292	\$58,506,917	\$45,284	0.29%	0.00%
55-59	1246	\$58,582,323	\$47,016	0.75%	0.00%
60-64	841	\$37,963,024	\$45,140	-0.81%	0.00%
65 & up	368	\$16,352,906	\$44,437	-0.31%	0.00%
	8135	\$341,044,247			

This analysis is not as robust as an analysis that would be done in an experience study but it provides enough information for general comments. The results suggest first of all that in terms of the pay increases given, the 2.5% and 4% ultimate figures are reasonable based on the data. They are also reasonable because they both equal or, in the case of Police and Fire, exceed the inflation assumption.

The figures do suggest that the assumed merit and longevity increases for general employees at the younger ages may be too low. The retained actuary recommends changing to a service-based pay increase assumption for both General and Police and Fire -- because of that we can't directly compare the results of the above analysis with theirs. However they do say that the change to the General salary scale will increase costs, which is in line with our analysis.

Demographic Assumptions

The following chart from the retained actuary's experience study summarizes the experience for the major decrement assumptions.

Mortality	Actual release of liability due to deaths was less than expected, except for General – Females. Larger difference for P/F than General.
Retirement	Higher number of retirements from active status for all 3 groups except for early retirement for General Employees (fewer than expected). Actual vs expected experience was much higher for Police (188% A/E ratio) and Fire (152% A/E ratio)
Termination	Slightly more members terminated from active status than expected for General (103% A/E ratio), but far fewer than expected for P/F (63% A/E ratio).
Disability	Significantly lower number of actual vs expected disabilities for all 3 groups. Total of 18 disabilities over 4 years for groups combined.
Duty-related Disability	More disabilities were duty-related than assumed for General (24% vs 10% expected). Significantly lower number of duty-related disabilities for P/F (31% vs 78% expected). However, limited data means less credible.

The associated recommendations are below.

	Recommendation	Cost Impact
Mortality	Limited data and therefore, limited credibility. Move to most recent table published, based on public plan data. Separate assumptions for General and P/F.	Lower costs for General. Increase costs for P/F.
Retirement	Partially reflect actual experience by moving part way toward actual experience. Lower early retirement rates for General and increase rates for normal retirement. Significantly increase retirement rates for P/F.	Increase costs for both General and P/F.
Termination	Move to service-based assumption for both General (Male and Female) as well as Police/Fire (separate rates for each). Closely reflect observed experience	Lower costs for General. Increase costs for P/F.
Disability	Lower disability rates for both General and Police/Fire	Lower costs for all groups.
Duty-related Disability Percentage	Increase for General. Decrease for union Police/Fire. Non-union Police/Fire match General. None eligible for 90% benefit.	Increase costs for General. Lower costs for P/F.

We will discuss retiree mortality and retirement in depth. We reviewed the retained actuary's PowerPoint presentations on the other assumptions and find them to be generally reasonable.

Retiree Mortality

Given the high proportion of retirees in the total population, this is a very significant assumption. In CMERS, there are 8,024 retired general members and 3,194 retired Police Officers and Firefighters. This would mean that per year, there are 200 or so expected deaths in the entire retired population. The number of expected deaths is therefore much too small to provide credible experience. The retained actuary assesses the mortality experience by using the ratio of actual to expected deaths. Such ratios are referred to as "A/E ratios." An A/E ratio of 100% means that the mortality assumption is a perfect match to experience in total. A ratio less than 100% means that the mortality table is overstating the number of deaths and that it may be understating the liabilities. A ratio greater than 100% means that the mortality table is understating the number of deaths and that it may be overstating the liabilities (i.e., the table is conservative). The retained actuary recommends a change in the mortality table as follows. The percentage figures refer to A/E Ratios.

➤ **Recommendations:**

- Pub-2010 Below Median General Employees Mortality Table with a one-year age setback for males and a two-year set forward for females
- Pub-2010 Public Safety Mortality Table with one-year set forward
- Improvements in future based on Scale MP-2021

	Males	Females
	Current / Proposed	Current / Proposed
General Employees	96% / 99%	106% / 103%
Police and Fire	87% / 94%	Limited Data

In all cases, the retained actuary is moving the A/E ratio toward 100%, which is standard actuarial practice. Taking the above at face value, we think that the mortality tables may be a good fit for general members, but it is possible that they may understate liabilities for Police and Fire members. However, the PowerPoint that we reviewed did not explain how the retained actuary accounted for the credibility of the subject population. Given the small sample size, we would prefer just using a standard table, such as the Wisconsin Projected Experience Table.

Retirement

Rates of retirement can have significant effects on liabilities. The retained actuary summarized retirement experience in the Experience Study Report as follows.

	Exposure	Actual	Expected	A/E Ratio	
				Count	Weighted
General: Early	2,430	53	97	55%	45%
General: Normal					
Male	2,046	438	478	92%	102%
Female	2,414	495	507	98%	120%
Police	755	361	196	184%	188%
Fire	537	156	103	151%	152%

These figures suggest that the current retirement rates significantly understate what is actually occurring in the Police and Fire population. This seems to be a phenomenon among safety plans generally. We do not know the extent to which it will be persistent, but we do agree with the retained actuary that the assumed rates must be increased.

The chart below shows the increases that the retained actuary proposes.

Retirement Rates			
General Employees	A/E Ratios		
	Current	Proposed	
Early Retirement	45%	75%	
Normal Retirement			
Male	102%	96%	
Female	120%	105%	
Safety Employees			
Police	188%	128%	
Fire	152%	119%	

We would typically like to see the safety rates move closer to 100% than the above indicates. However, we recognize that the instant experience may not persist.

Actuarial Methods

We concur with the decision to retain the Entry Age Actuarial Cost Method as long as the plan remains open. If the plan is closed we suggest that the projected unit credit method is more consistent with the accrual of benefits in a closed plan than the entry age normal method.



Updated Liability Estimate

We have made an estimate shown below of the accrued and unfunded liability at 6.8%, the discount used by WRS using the current demographic assumptions, and the experience study assumptions.

January 1, 2022 Valuation Combined Fund (\$000)				
Current Demographic Assumptions	6.50%	6.80% Est	7.00%	7.50%
Actuarial Value of Assets	\$5,673,797	\$5,673,797	\$5,673,797	\$5,673,797
Actuarial Accrued Liability	\$7,679,982	\$7,423,795	\$7,253,004	\$6,864,666
Unfunded Accrued liability	\$2,006,185	\$1,749,998	\$1,579,207	\$1,190,869
Estimated After Experience Study				
Actuarial Value of Assets		\$5,673,797		
Actuarial Accrued Liability		\$7,501,735		
Unfunded Accrued liability		\$1,827,938		

This is necessarily an approximation. We do not have data sufficient to make an estimate based on a valuation. At the time of the valuation, the market value of the Combined Fund was \$6,367,898 which, if used in the above, would lower the estimated unfunded liability to \$1.1 Billion.

We do think it is possible that some of the recommended assumptions may understate liabilities, so a final estimate done with a full valuation might indicate somewhat greater liability.

In order to obtain fully accurate figures, it would be necessary to assemble data and run an actuarial valuation.

Unfunded Liability – Milwaukee County

Executive Summary

We have reviewed the existing actuarial assumptions, the January 1, 2022 actuarial report, the material presented in a PowerPoint that summarized the 2017 to 2021 experience study, and a report dated January 13, 2023 that projects plan costs assuming that new hires go into the Wisconsin Retirement System. The Experience Study PowerPoint was released in October of 2022. We think that the demographic assumptions are generally reasonable, although left to our own devices we would use different assumptions than the retained actuary for mortality and certain other decrement rates. We think that the economic assumptions are also reasonable, but we would prefer a lower discount rate assumption due to the large negative cash flows and the related fact that 81% of the liabilities are for retirees. If inactive vested people are included, the ratio of non-active to total liabilities is 84%.

The January 1, 2022 Valuation prepared by the retained actuaries presents information from which we were able to derive the following.

	January 1, 2022 Valuation		
	6.50%	7.50%	8.50%
Actuarial Value of Assets	\$1,763,496,322	\$1,763,496,322	\$1,763,496,322
Actuarial Accrued Liability	\$2,529,191,199	\$2,301,217,070	\$2,108,757,021
Unfunded accrued Liability	\$765,694,877	\$537,720,748	\$345,260,699

We made an estimate of liabilities at 6.8% discount and adjusted it approximately to reflect the revised assumptions in the recent experience study. The result of that estimate is that the accrued liability would become approximately \$2.4 Billion with the new assumptions and 6.8% discount. The retiree liabilities would increase to approximately \$2.0 Billion. The Market Value of Assets at December 31, 2021 was \$1.970 Billion. This means that essentially all of the assets are needed to cover retiree liabilities and that essentially all of the unfunded liability is for current active members. However, the November 2022 Flash report indicates that the assets are \$1.7 Billion so that as of that date, the assets are probably not sufficient to cover the retiree liabilities.

If the plan is closed to new hires we would suggest that the investment consultant review the asset allocation with that in mind and that the actuary reconsider the actuarial assumptions and the actuarial cost method. We suggest that the Projected Unit Credit (PUC) method is more consistent with the accrual of benefits in a closed plan than the entry age normal method. Since the vast majority of liabilities are for retirees, the change to PUC would not have a large effect on liabilities. We would also prefer to express the liabilities using a Low Default Risk Obligation Measure.

Detailed Analysis of Assumptions and UAAL

The chart below is developed from the January 1, 2022 valuation report. It shows the manner in which the retiree assets were invested at that time.

Plan Assets at December 31, 2021		
Cash, Receivables Etc.	Market Value	% of Total
Cash	\$66,053,830	
Receivables	\$3,817,689	
Other	\$44,125,976	
-Liabilities	-\$52,913,130	
Subtotal	\$61,084,365	3.1%
Invested Assets		
Fixed Income	\$315,088,223	16.0%
Domestic and International Equities	\$765,832,253	38.9%
Private Equity	\$319,281,062	16.2%
Diversifying Strategies	\$360,756,892	18.3%
Real Estate	\$148,324,710	7.5%
Subtotal	\$1,909,283,140	96.9%
Total Assets	\$1,970,367,505	100.0%

Information presented elsewhere in the actuarial report indicates that retiree liabilities valued at 7.5% discount are \$1,854,929,167 and therefore that they are 94% of total assets at market value as of January 1, 2022. That is a much higher ratio than we typically see. The income statement below is based upon data in the actuarial report.

Income Statement	
Net Assets January 1, 2021	\$1,792,916,838
Contribution Income	
Employer	\$62,113,812
Member	\$13,390,188
Total	\$75,504,000
Net Investment Return	\$304,173,201
Benefit Payments	
Retiree Benefits	\$199,326,814
Contribution Refunds	\$2,899,720
Total	\$202,226,534
Net External Cash Flow	\$75,504,000
Net Assets December 31, 2021	\$1,970,367,505
Contributions as a % of Assets	4.2%
Benefit Payments as a % of Assets	11.3%
Net External Cash Flow as a % of Assets	-7.1%

Negative Net External Cash Flow at a -7.1% level in a plan whose liabilities are almost entirely in payment status is a leading indicator of potential exhaustion of assets.



Economic Assumptions

In this section of the report, we present our analysis of the Economic and Demographic Assumptions Studies that the retained actuary used to calculate the unfunded liability of the retirement system. The assumptions are the basis (i.e., rationale) for the calculation of the actuarial accrued liability, and, therefore of the unfunded liability. Actuarial assumptions must comply with the following:

- (1) Actuarial Standards of Practice (ASOP) No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*; and
- (2) ASOP No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*.

The items reviewed in connection with this part of our analysis include and are limited to:

- An Actuarial Valuation of the retirement system as of January 1, 2022 and dated May 16, 2022 signed by Matthew Strom and Geoff Bridges of the Segal Company.
- An Actuarial Experience Study covering the period 2017-2021 dated October, 2022 also signed by Matthew Strom and Geoff Bridges of the Segal Company.
- An asset liability study performed by Segal Marco Advisors (SMA) date October 8, 2020.
- A letter dated January 13, 2023 from Geoff Bridges to Cynthia Pahl that describes scenarios of Projected costs for the Milwaukee County ERS under various circumstances.

The actuarial assumptions setting process is a combination of art and science. An actuary's professional judgment is a key component in the assumption setting process. Different actuarial consulting firms, and different actuaries within the same firm, may have significantly different thoughts on how some assumptions should be developed. Our analysis will not focus on minor differences in judgment items, but rather only on issues that could materially affect the assessment of the unfunded actuarial accrued liability.

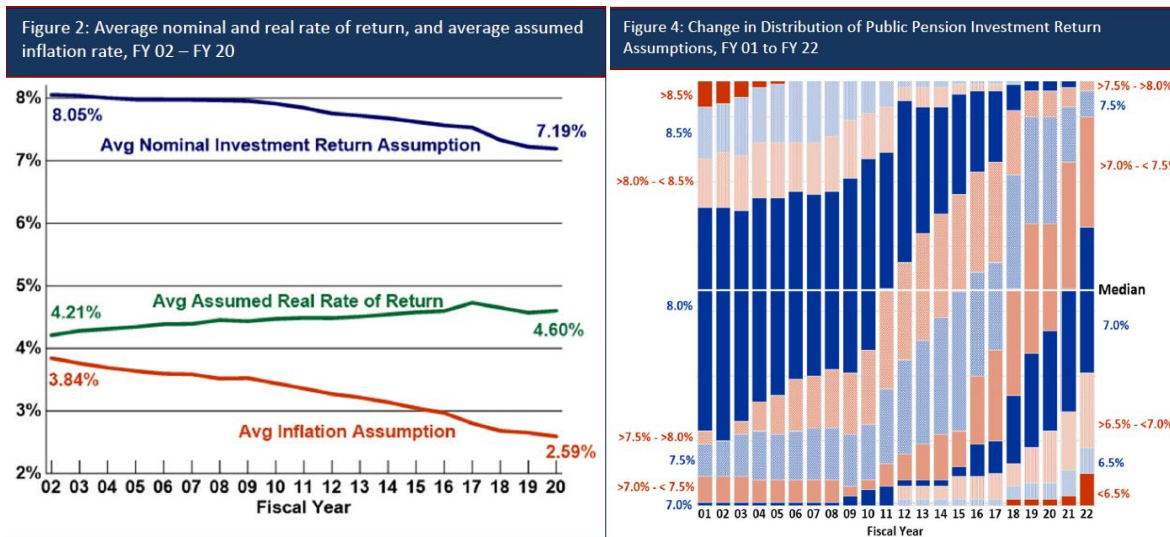
Economic Assumptions

The economic assumptions used in the January 2022 valuation were as follows:

- Inflation: 2.5%
- Investment Return: 7.5%
- Cost of Living Adjustments: No assumption is needed. The retiree cost of living adjustments are fixed at 2% of the original amount
- Salary Increase Rates: Table by Age and Occupation
- Rate of increase of UAAL payments: 1.75%

Peer Comparison

The charts below are taken from the NASRA March 2022 Issue Brief “Public Pension Plan Investment Return Assumptions”.



Actuarial assumptions cannot and should not be judged based upon a peer comparison, but assumptions deviating materially from the peer universe may require special scrutiny. The charts do suggest that the 2.5% inflation assumption is mainstream, but they also suggest that the 7.5% investment return assumption is in the minority.

Guidance regarding the selection of economic assumptions for measuring pension obligations is provided by ASOP No. 27. The standard requires that the selected economic assumptions be consistent with each other. That is, the selection of the investment return assumption should be consistent with the selection of the wage inflation and price inflation assumptions.

ASOP No. 27 (applicable to valuation dates on or after August 1, 2021) defines a reasonable economic assumption as an assumption that has the following characteristics:

- It is appropriate for the purpose of the measurement;
- It reflects the actuary’s professional judgment;
- It considers historical and current economic data that is relevant as of the measurement date;
- It reflects the actuary’s estimate of future experience, the actuary’s observation of the estimates inherent in market data (if any), or a combination thereof; and
- It has no significant bias (i.e., it is not significantly optimistic or pessimistic), except when provisions for adverse deviation or plan provisions that are difficult to measure are included and disclosed or when alternative assumptions are used for the assessment of risk.

In selecting economic assumptions, the actuary relies on many different experts (e.g., investment consultants) for data and analysis. However, as required by ASOP No. 27, “When the actuary is responsible for selecting or giving advice on selecting economic assumptions within the scope of this standard, the actuary may incorporate the views of experts but the selection or advice should reflect the actuary’s professional judgment.”

Price Inflation

Price inflation underlies both the wage inflation and investment return assumptions.

Sources of data that GRS generally consider in the analysis of the price inflation assumption include:

- (1) Inflation expectations of various Federal Reserve Banks (e.g., Cleveland, St. Louis)
- (2) Philadelphia Federal Reserve quarterly survey of Society of Professional Forecasters
- (3) Comparison of Treasury yields and Treasury Inflation Protected Securities (TIPS)
- (4) Future expectations of the plan's investment consultant and other investment consultants that GRS monitors

Presented on the following page are forward-looking price inflation forecasts that GRS monitors to assist in developing the price inflation assumption.

Forward-Looking Price Inflation Forecasts^a	
Congressional Budget Office^b 5-Year Annual Average 10-Year Annual Average	3.23% 2.81%
Federal Reserve Bank of Philadelphia^c 5-Year Annual Average 10-Year Annual Average	3.75% 2.95%
Federal Reserve Bank of Cleveland^d 10-Year Expectation 20-Year Expectation 30-Year Expectation	2.22% 2.29% 2.37%
Federal Reserve Bank of St. Louis^e 10-Year Breakeven Inflation 20-Year Breakeven Inflation 30-Year Breakeven Inflation	2.26% 2.50% 2.26%
U.S. Department of the Treasury^f 10-Year Breakeven Inflation 20-Year Breakeven Inflation 30-Year Breakeven Inflation 50-Year Breakeven Inflation 100-Year Breakeven Inflation	2.07% 2.40% 2.21% 2.34% 2.44%
Social Security Trustees^g Ultimate Intermediate Assumption	2.40%

^aEnd of the Fourth Quarter, 2022. Version 2023-02-09 by Gabriel, Roeder, Smith & Company.

^bThe Budget and Economic Outlook: 2022 to 2032, Release Date: May 2022, Consumer Price Index (CPI-U), Percentage Change from Year to Year, 5-Year Annual Average (2022 - 2026), 10-Year Annual Average (2022 - 2031).

^cFourth Quarter 2022 Survey of Professional Forecasters, Release Date: November 14, 2022, Headline CPI, Annualized Percentage Points, 5-Year Annual Average (2022 - 2026), 10-Year Annual Average (2022 - 2031).

^dInflation Expectations, Model output date: December 1, 2022.

^eThe breakeven inflation rate represents a measure of expected inflation derived from X-Year Treasury Constant Maturity Securities and X-Year Treasury Inflation-Indexed Constant Maturity Securities. Observation date: December, 2022.

^fThe Treasury Breakeven Inflation (TBI) Curve, Monthly Average Rates, December, 2022.

^gThe 2022 Annual Report of The Board of Trustees of The Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, June 2, 2022, Long-range (75-year) assumptions, Intermediate, Consumer Price Index (CPI-W), for 2026 and later.

In addition to the information in the chart, it is important to recognize that the Federal Reserve targets 2% inflation as measured by the Personal Consumption Expenditures (PCE) index and is taking aggressive action to bring inflation back to the 2% area.

Based on this information, we conclude that an inflation assumption of 2.5% is reasonable. We note that in the Phase 1 report of the asset allocation study prepared by Segal Marco Advisers, the investment consultant is basing its work on a 2.0% assumption. Since that study was performed two years ago, it is possible that they may have raised their inflation outlook since then.

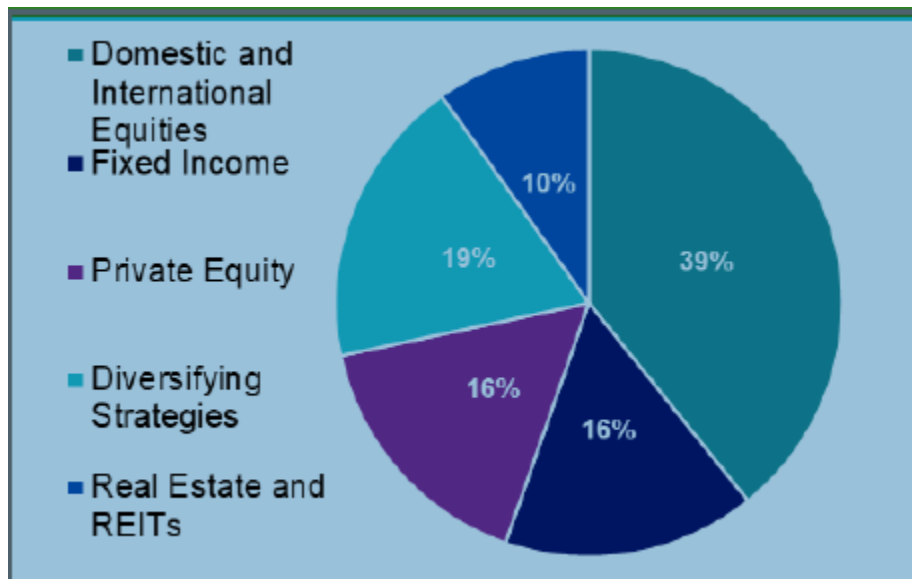
Investment Return

ASOP 27 says the following specifically regarding the investment return assumption:

3.8.3 Measurement-Specific Considerations—The actuary should take into account factors specific to each measurement in selecting an investment return assumption. Such factors may include the following:

- b. Investment Policy—The plan’s investment policy may include the following:
 - (i) the current allocation of the plan’s assets...

The actuarial valuation report contains the following information on the asset allocation as of December 31, 2021.



There is often great temptation to look to the past to test investment return assumptions. We do find the past interesting. We derived the chart below from information in the valuation report.

Development of Market Value Net Return 2008 to 2021					
Year	Beginning Assets	Net Return	Ending Assets	Average Assets	ROR
2008	\$1,665,511,165	-\$357,462,777	\$1,595,610,970	\$1,809,292,456	-19.8%
2009	\$1,595,610,970	\$313,462,671	\$1,822,539,985	\$1,552,344,142	20.2%
2010	\$1,822,539,985	\$203,770,758	\$1,895,166,943	\$1,756,968,085	11.6%
2011	\$1,895,166,943	\$4,039,718	\$1,742,106,887	\$1,816,617,056	0.2%
2012	\$1,742,106,887	\$178,833,104	\$1,768,434,628	\$1,665,854,206	10.7%
2013	\$1,768,434,628	\$253,385,088	\$1,879,234,430	\$1,697,141,985	14.9%
2014	\$1,879,234,430	\$92,984,293	\$1,822,579,695	\$1,804,414,916	5.2%
2015	\$1,822,579,695	\$35,190,400	\$1,716,151,763	\$1,751,770,529	2.0%
2016	\$1,716,151,763	\$106,649,356	\$1,671,682,331	\$1,640,592,369	6.5%
2017	\$1,671,682,331	\$249,003,287	\$1,786,408,565	\$1,604,543,805	15.5%
2018	\$1,786,408,565	-\$38,060,799	\$1,618,310,314	\$1,721,389,839	-2.2%
2019	\$1,618,310,314	\$245,570,699	\$1,738,628,225	\$1,555,683,920	15.8%
2020	\$1,738,628,225	\$179,567,176	\$1,792,916,838	\$1,675,988,944	10.7%
2021	\$1,792,916,838	\$304,173,201	\$1,970,367,505	\$1,729,555,571	17.6%

Most actuaries, including as far as we know, the retained actuaries, agree that actuarial assumptions, and, in particular, the investment return assumption must be forward looking. They are intended to be estimates of how the future may unfold, not what happened in the past.

Our comments are based on expected returns from a portfolio with the same asset allocation as the retirement system. Because GRS is a benefits consulting firm, it does not develop or maintain its own capital market expectations. Instead, we monitor forward-looking expectations developed by several major investment consulting firms and maintain them in a tool that we refer to as the Capital Market Assumption Modeler (“CMAM”).

Our 2022 CMAM is based upon capital market assumptions from the first quarter of 2022. We are aware that capital market assumptions have generally increased since that time. Twelve Investment Firms in our database provide Capital Market Assumptions over a 10-year horizon. Six of those firms also provide Capital Market Assumptions over a 20-30-year horizon. The results over a 10-year horizon are in the chart on the following page.

GRS 2022 CMAM				
Capital Market Assumption Set (CMA)	Distribution of 10-Year Average Geometric Net Nominal Return			Probability of exceeding 7.50%
	40th	50th	60th	
(1)	(2)	(3)	(4)	(5)
1	4.06%	5.04%	6.02%	26.43%
2	4.38%	5.43%	6.50%	31.23%
3	4.52%	5.46%	6.42%	29.56%
4	4.43%	5.47%	6.53%	31.39%
5	4.68%	5.59%	6.50%	29.79%
6	4.86%	5.87%	6.89%	34.27%
7	4.81%	5.92%	7.04%	36.02%
8	5.02%	6.07%	7.13%	36.63%
9	5.15%	6.22%	7.30%	38.25%
10	5.35%	6.36%	7.37%	38.76%
11	5.88%	6.91%	7.95%	44.24%
12	6.51%	7.67%	8.84%	51.47%
Average	4.97%	6.00%	7.04%	35.67%

Our tool indicates further that over a 20-30-year horizon, the 50th percentile of return is 7.16%. This suggests to us that the 7.5% assumed return is aggressive for a January 1, 2022 valuation. However, we are aware that capital market assumptions have increased materially since our tool was last updated.

In the October, 2020 ALM study, Segal Marco Advisors posited a 6.4% geometric return over 10 years and a 7.0% geometric return over 20 years. These figures do not correspond exactly to ours because we are using January 2022 Capital Market Assumptions and SMA is using Capital Market Assumptions from 2020. Even though the correspondence is not exact, both sets of data suggest that the 7.5% return is aggressive.

Given the high negative external cash flows and the fact that 81% of the liabilities are in pay status, we are much more comfortable with a return expectation in the 7% area or below than we are with the current 7.5% assumption. In the experience study, the retained actuary recommends a reduction in the investment return to 7%. In our judgment, this is not unreasonable, but given the heavy concentration of retiree liabilities we would prefer an assumption even lower. In particular, if the retirement system is ever closed to new entrants, we would prefer an assumption well below 7%.

We have done some very rudimentary modeling of the operation of a closed plan (not based on the instant situation) which suggests that when a plan is closed the discount rate assumption should be below the assumption applicable to a similarly situated open plan by an amount, perhaps on the order of 100 to 200 basis points. This is because in a closed plan, it is not reasonable to assume that the asset allocation can be held constant indefinitely.

We note that Exhibit 1 on page 43 to 45 of the valuation provides information that allows us to derive results at 6.5%. This will allow us, by interpolation, to estimate the effect of a lesser discount rate.



Salary Increase Rates

The assumed pay increase rates below are taken from a chart on page 51 of the actuarial valuation.

Age	General Employees	Elected Officials	Deputy Sheriffs
20	10.5%	3.5%	11.5%
25	6.0	3.5	10.0
30	5.0	3.5	7.1
35	4.2	3.5	5.6
40	4.0	3.5	3.2
45	3.0	3.5	3.0
50	3.0	3.5	3.0
55	3.0	3.0	3.0
60	3.0	3.0	3.0

In order to assess the salary increase assumption we reviewed the data summaries beginning on page 65 of the valuation report. We displayed the average pay by age bracket and then calculated the average 5-year increase for each bracket. We then compared those increases to the assumed increases shown above after first subtracting 2.5% from the actuarial assumptions.

General Employees				
Age Group	No.	Average Pay	Merit and Longevity Increase	
			Actual	Assumed
24 & Under	98	\$43,756	n/a	8.00%
25-29	241	\$47,568	1.68%	3.50%
30-34	365	\$53,006	2.19%	2.50%
35-39	377	\$57,733	1.72%	1.70%
40-44	395	\$62,664	1.65%	1.50%
45-49	428	\$63,986	0.42%	0.50%
50-54	437	\$64,732	0.23%	0.50%
55-59	358	\$63,694	-0.32%	0.50%
60-64	249	\$63,569	-0.04%	0.50%
65 & up	105	\$64,481	0.29%	0.50%
	3053			

This analysis is not as robust as an analysis that was done in the experience study but it provides enough information for general comments. The results suggest the reasonableness of the current assumption. We note that in the experience study, the retained actuary recommends only minor changes to the salary scale assumption for general employees.

The sample size for Deputy Sheriffs and elected officials is too small for an analysis such as we did above to be meaningful. We reviewed the sections of the experience study related to Deputy Sheriffs and elected officials related to the salary scale assumption and find the results to be reasonable based upon the data presented.

Demographic Assumptions

The Following chart from the retained actuary's experience study shows the current and proposed demographic assumptions and the effect of the changes on contribution rates.

Assumption	Current	Proposed	Impact on Actuarially Determined Contribution*
Healthy Post-Retirement Mortality - Retirees	For males, 102% of RP-2006 Healthy Annuitant male, projected with generational projection using scale MP-2016. For females, 107% of RP-2006 Healthy Annuitant female, projected with generational projection using scale MP-2016.	General Employees – Pub-2010 General Retired Lives Table for males and females with credibility adjustments of 104% and 121%, respectively, of the rates for all ages	Increase
		Deputy Sheriffs – Pub-2010 Safety Retired Lives Table for males and females with no credibility adjustments for all ages	Increase
		Elected Officials – Pub-2010 General Above-Median Retired Lives Table for males and females with no credibility adjustments for all ages	Increase
		Updating the mortality projection scale to MP-2021	Decrease
Healthy Post-Retirement Mortality - Beneficiaries	Same as Retirees mortality above	Pub-2010 General Contingent Survivor Table for males and females with credibility adjustments of 107% and 100%, respectively, of the rates for all ages	Increase
Disabled Post-Retirement Mortality	For males, 97% of RP-2006 Disabled Annuitant male, projected with generational projection using scale MP-2016. For females, 95% of RP-2006 Disabled Annuitant female, projected with generational projection using scale MP-2016.	Non-Deputy Sheriffs –Pub-2010 Non-Safety Disabled Lives Table with credibility adjustments for males and females of 107% and 98%, respectively, of the rates for all ages	Increase
		Deputy Sheriffs –Pub-2010 Safety Disabled Lives Table with no credibility adjustments for males and females for all ages	Increase
		Updating the mortality projection scale to MP-2021	Decrease
Pre-Retirement Mortality	For males, RP-2006 Employee male, projected with generational projection using scale MP-2016. For females, RP-2006 Employee Annuitant female, projected with generational projection using scale MP-2016.	General Employees – Pub-2010 General Employee Table by gender and age	Increase
		Deputy Sheriffs – Pub-2010 Safety Employee Table by gender and age	Increase
		Elected Officials – Pub-2010 General Above-Median Employee Table by gender and age	Increase
		Updating the mortality projection scale to MP-2021	Decrease
Active Retirement	All Groups: Unisex age-based rates split by group, with General Employees further split by backdrop eligibility	Modifying the rates to better match actual experience	Increase
Inactive Retirement	All Groups: 100% of inactive members who terminate employment are assumed to retire at the participants' Normal Retirement Age	Changing the rates to reflect one set of age-based retirement rates for males and females in all groups to better match actual experience	Decrease
Termination	Select and Ultimate Tables for General Employees and Elected officials. Deputy Sheriffs are based on age only. Rates are unisex.	Adjusting the termination rates for General Employees and Deputy Sheriffs to better fit experience and retaining the "Select and Ultimate" tables where applicable. No changes to elected officials.	Decrease
Disability Retirement	Rates are based on age and are unisex for all groups.	Deputy Sheriffs – a decrease of 20% applied to the current rates before age 40 and reflecting heavier experience after age 40 resulting in increased rates	Increase
		Non-Deputy Sheriffs – a uniform decrease of 20% applied to the current rates	
Spouse Information	80% of members are married.	80% of members are married.	Increase
	Male spouses are the same age as female spouses.	Male spouses are 2 years older than female spouses.	
	100% of spouses are of the opposite gender.	100% of spouses are of the opposite gender.	
Dependent Information	21.6% of General Employees, 43.2% of Deputy Sheriffs and elected Officials are married with at least one dependent child. For participants who die prior to age 60, it is assumed the dependent child will remain a dependent until the member would have turned age 60.	No Change	N/A
Benefit Election	100% of members are assumed to elect the Straight Life Annuity form of payment.	Non-married members – 100% assumed to elect the Straight Life Annuity form of payment Married members – 100% assumed to elect 100% Joint & Survivor (J&S) form of payment	Increase
Death Benefits	100% of death benefits are assumed to be ordinary.	No Changes	N/A
Disability Type	For Represented Employees, 50% of disabilities are assumed to be ordinary and 50% are assumed to be accidental.	For Represented Employees, 60% of disabilities are assumed to be ordinary and 40% are assumed to be accidental.	Increase
	For Non-Represented Employees, 100% of disabilities are assumed to be ordinary.	For Non-Represented Employees, 30% of disabilities are assumed to be ordinary and 70% are assumed to be accidental.	
Backdrop	75% of eligible participants are assumed elect backdrop Of these eligible participants, 75% are assumed to elect the max backdrop period. 25% are assumed to elect half the max backdrop period	50% of eligible participants are assumed elect backdrop Of these eligible participants, 100% are assumed to elect the max backdrop period.	Decrease

We will discuss retiree mortality and retirement in depth. We reviewed the retained actuary's PowerPoints on the other assumptions and find them to be generally reasonable.



Retiree Mortality

Given the high proportion of retirees in the total population, this is a very significant assumption. In the ERS, there are 7,829 retirees including beneficiaries. This would mean that per year, there are 100 to 200 or so expected deaths in the entire retired population. The number of expected deaths is too small to provide fully credible experience. The retained actuary assesses the mortality experience by using the ratio of actual to expected deaths and then uses statistical techniques to assign a credibility factor to the experience. Such ratios are referred to as “A/E ratios.” An A/E ratio of 100% means that the mortality assumption is a perfect match to experience in total. A ratio less than 100% means that the mortality table is overstating the number of deaths and that it may be understating the liabilities. A ratio greater than 100% means that the mortality table is understating the number of deaths and that it may be overstating the liabilities (i.e., the table is conservative). The retained actuary recommends a change in the mortality table for healthy retirees as follows.

Recommend updating base tables to appropriate Pub-2010 mortality tables, with adjustments based on ERS group-specific experience where “credible” data exists. We recommend the following separate tables for each group:

- **General Employees** – Pub-2010 General Retired Lives Table for males and females with credibility adjustments of 104% and 121%, respectively, of the rates for all ages
- **Deputy Sheriffs** – Pub-2010 Safety Retired Lives Table for males and females with no credibility adjustments for all ages
- **Elected Officials** – Pub-2010 General Above-Median Retired Lives Table for males and females with no credibility adjustments for all ages
- Updating the mortality projection scale to MP-2021 to reflect future improvements in mortality for all groups.

The A/E ratios upon which the change is based are shown below:

Healthy Retiree Mortality	Actual to Expected Ratio (A/E)			
	General		Sheriff Deputies	
	Current	Proposed	Current	Proposed
Males	97%	101%	86%	100%
Females	104%	105%	180%	218%

Generally, the retained actuary is moving the A/E ratio toward 100%, which is standard actuarial practice. The results for female deputies look odd, but that is a result of the very small sample size. We think these results are reasonable.

Other Demographic Assumptions

Results for the other demographic assumptions, which do include disabled and beneficiary mortality, are summarized below.

	Actual to Expected Ratio (A/E)			
	General		Sheriff Deputies	
	Current	Proposed	Current	Proposed
Disabled Retiree Mortality				
Males	137%	140%	25%	102%
Females	84%	85%	146%	419%
Beneficiary Mortality				
Males	159%	144%	Same	Same
Females	94%	105%	Same	Same
Active Retirements				
Backdrop Eligible	151%	113%	n/a	n/a
Not Backdrop Eligible	212%	140%	149%	127%
Inactive Retirements	47%	104%	Same	Same
Termination				
Select Rates				
Year 1	118%	110%	n/a	n/a
Year 2	87%	91%	n/a	n/a
Year 3	94%	96%	n/a	n/a
Year 4	105%	105%	n/a	n/a
Year 5	140%	119%	n/a	n/a
Ultimate Rates	111%	108%	101%	101%
Disability Retirement	75%	93%	580%	146%

The sample size for disabled retiree and for beneficiary mortality is typically small. Although the recommendations do not move in the direction we would expect (toward 100%) there could be good reasons for that. For active and inactive retirement, disability retirement and terminations, the recommendations move the A/E ratios in the expected direction and we think the results are reasonable.

Actuarial Methods

We concur with the decision to retain the Entry Age Actuarial Cost Method as long as the plan remains open. If the plan is closed we suggest that the projected unit credit method is more consistent with the accrual of benefits in a closed plan than the entry age normal method.

Updated Liability Estimate

We have made an estimate shown below of the accrued and unfunded liability at three different discount rates including 6.80%, the discount used by WRS, and using the experience study assumptions.

	January 1, 2022 Valuation After Experience Study		
	6.50%	6.80%	7.00%
Actuarial Value of Assets	\$1,763,496,322	\$1,763,496,322	\$1,763,496,322
Actuarial Accrued Liability	\$2,503,272,839	\$2,432,669,136	\$2,385,600,000
Unfunded Accrued Liability	\$739,776,517	\$669,172,814	\$622,103,678
Estimated Retiree Liabilities	\$2,017,966,561	\$1,961,050,707	\$1,923,106,804

The Market Value of Assets at December 31, 2021 was \$1.970 Billion. This means that essentially all of the assets are needed to cover retiree liabilities and that essentially all of the unfunded liability is for current active members. However, the November 2022 Flash report indicates that the assets are \$1.7 Billion as of that time, slightly less than the actuarial value in the above chart, so that as of November, 2022, the assets are probably not sufficient to cover the retiree liabilities.

These estimates are necessarily approximations. We do not have data sufficient to make an estimate based on a valuation.

In order to obtain fully accurate figures, it would be necessary to assemble data and run an actuarial valuation.

SECTION C

REVIEW OF SOFT CLOSE PROJECTIONS

Milwaukee City – Soft Close Projections

Cavanaugh Macdonald (CavMac) performed projections in a DRAFT letter dated January 13, 2023. As stated in their letter, the projections covered the following change in plan provisions:

- CMERS is closed to all new hires. Current members of CMERS continue to accrue benefits under CMERS.
- All future employees of the City of Milwaukee, including Police and Fire, and other participating employers move to WRS after January 1, 2023.
- Contributions are made to the retirement system in which the member participates.

CavMac developed what they termed the “All-in” Lump sum cost of closing the Milwaukee Plan as of January 1, 2023 as follows (in \$ Millions):

Present Value as of January 1, 2023 of:	Investment Return Assumption		
	7.50%	7.00%	6.80%
CMERS			
Projected Benefit Payments	\$ 7,763	\$ 8,277	\$ 8,500
Projected Administrative Expenses	126	138	143
Projected Employee Contributions	(282)	(292)	(296)
January 1, 2023 Estimated Market Value	<u>(5,478)</u>	<u>(5,478)</u>	<u>(5,478)</u>
Total CMERS Employee "All in" Cost	\$ 2,129	\$ 2,645	\$ 2,869
WRS			
Projected Employer Contributions	\$ 842	\$ 964	\$ 1,020
Total			
"All-in" Cost	\$ 2,971	\$ 3,609	\$ 3,889

The “All-in” lump sum cost can be viewed as a type of liability similar to that developed by the Aggregate Cost Method – which calculates the Total Present Value of Benefits (PVFB) and then the difference between the PVFB and the employer assets (adjusted for items such as expenses and future contributions) is funded for over a specific period of time. While this is an acceptable approach for determining plan costs, comparison to other systems can be difficult since there is no ‘normal cost’ component as developed under the traditional Entry Age Normal Cost Method.

After developing this “all in” cost, CavMac provided 30-year projections for the proposed scenario showing:

- “All in” cost amortized over 30 and 20 year periods.
- New hire cost under WRS.
- The Total of the “All in” and New Hire cost above.
- Results at 7.5%, 7.0%, 6.8% interest rate assumptions using both 30- and 20-year amortization.

Milwaukee City – Soft Close Projection

The cost results shown appear to be internally consistent and form an acceptable approach. We note, however, there was no baseline scenario shown in the projections to compare results. CavMac stated in their report “We believe this comparison would have limited value at this time...but would be happy to provide upon request”. While we understand the rationale as stated, it can be difficult for an outside reader to come to conclusions regarding the cost impact without a baseline scenario.

CavMac also noted that the proposed change to close CMERS to new members significantly increases the funding risk. We agree with this point and added additional commentary in the Executive Summary regarding closed plan risk. Essentially, we think that the increasing negative cash flows associated with a closed plan will eventually necessitate a shift to less risky more liquid investments which will lower the return potential of the portfolio and increase contribution requirements beyond that shown in the study. This would be a matter for the investment consultant to opine on.

Milwaukee County – Soft Close Projections

The Segal Company (Segal) performed projections in a letter dated January 13, 2023. The letter defined “ERS” as the Employees’ Retirement System of the County of Milwaukee, and “WRS” as the Wisconsin Retirement System. As stated in their letter, the projections covered 5 scenarios:

- Scenario 1 (Baseline). Projection assumes the current valuation investment return of 7.5% is maintained. New employees continue to participate in ERS.
- Scenario 2 (Baseline + New Employees to WRS) – Projection assumes the current valuation investment return assumption of 7.5% is maintained. New employees hired on or after January 1, 2024 become WRS members when hired.
- Scenario 3 (Updated 7.0% Investment Return Assumption) – Projection assumes the valuation investment return assumption is reduced to 7.00% effective January 1, 2023. New employees continue to participate in ERS.
- Scenario 4 (Updated 7.0% Investment Return Assumption + New Employees to WRS) – Projection assumes the valuation investment return assumption is reduced to 7.0% effective January 1, 2023. New employees hired on or after January 1, 2024 become WRS members when hired.
- Scenario 5 (Updated 6.8% Investment Return Assumption + New Employees to WRS) – Projection assumes the valuation investment return assumption is reduced to 6.80% effective January 1, 2023. New employees hired on or after January 1, 2024 become WRS members when hired. Legacy ERS employees member contribution rate is set to ½ of the normal cost effective January 1, 2024.

For each scenario, Segal provided 20-year projected results including ERS closed pay, new member pay, ERS normal cost, ERS member contribution rate, ERS UAAL payment, ERS Total UAAL, ERS employer contribution, WRS employer contribution and WRS member contribution. This additional detail greatly aided our review of the various components of the calculations. The cost results shown appear to be internally consistent and form an acceptable approach. We note, however, that the UAAL calculation was not clearly defined in the projection -- the UAAL amounts shown at the beginning of the projection (2023) are as follows:

- \$474.47 million at 7.5% (scenarios 1 and 2)
- \$581.67 million at 7.0% (scenarios 3 and 4)
- \$627.19 million at 6.8% (scenario 5)

From the January 1, 2022 valuation report, the UAAL amounts are:

- \$537.7 million at 7.5% on Actuarial Value of Assets Basis
- \$330.9 million at 7.5% on Market Value Basis



Milwaukee County – Soft Close Projections

We note that the January 1, 2022 results were produced before experience study results and so it is possible that the projection results were based on new estimates of assumptions and estimated assets as of January 1, 2023. However, Segal's January 13 letter also states that Scenario 1 is effectively the January 1, 2022 valuation baseline projection. It would have been helpful to add additional detail on how the UAAL was calculated, whether it was based on actuarial or market value and whether it included the unfavorable investment performance during 2022. Based on the starting UAAL measure of \$474.47 million used in the projections, the change due to the discount rate seemed reasonable. It should also be noted that on Page 4 of the Segal document, the starting member contribution rate for Scenario 5 was 7.4%. However, the related Scenario 5 detail page shows a member rate of 5.2% - perhaps one of these figures is a typo.

The summary scenarios shown on page 3 illustrate that:

- Closing the system to new hires (with no change in investment return) increases the overall cost.
- Lowering the investment return assumption to 7.0% or 6.8% will also increase overall cost.
- ERS UAAL is paid off after 10 years under the current 7.5% investment return assumption.

The increase in cost mentioned in the first bullet point above is probably due at least in part to the fact that WRS contributions are made based upon a 6.8% investment return assumption which is below the assumption made in the soft close projections. We don't think this should be viewed as a real effect because there is no reason to assume that Milwaukee County investment performance will consistently exceed that of the SWIB. We do agree, however, that the closure will increase contribution requirements, but for a different reason stated below.

Page 5 of the study also had a section titled "Discussion of Risk". While this is important for the intended user to understand risk, this section was somewhat generic and did not address specific risks that can occur due to plan closure. Essentially, we think that the increasing negative cash flows associated with a closed plan will eventually necessitate a shift to less risky more liquid investments which will lower the return potential of the portfolio and increase contribution requirements beyond that shown in the study. This would be a matter for the investment consultant to opine on.

Summary Conclusions

In summary, the projections for both Milwaukee City and Milwaukee County appear to be reasonable approaches for determining the long-term cost. But they do ignore the effect of increasing negative cash flows on the investment program. We think there should be a serious discussion with the investment consultants regarding this matter and that de-risking and risk transfer should be explored. Additional detail on how the initial UAAL was developed would have been helpful. We note that the approaches are very different regarding cost method, amortization methods, scenarios, metrics, etc. We consolidated these into a single approach for both Milwaukee City and Milwaukee County in the next section of this report.

SECTION D

COMPARISON CHARTS AND LEGISLATIVE FISCAL BUREAU REQUESTED INFORMATION

Comparison of Scenarios

As noted in Section C, the soft close projections provided for Milwaukee City and Milwaukee County had numerous differences in methodology. In order to have a consistent basis for comparison across all scenarios, we have summarized these differences (along the methodology used by GRS) in the chart below.

	Milwaukee City (CavMac)	Milwaukee County (Segal)	Current Study (GRS)
Liability	Present Value of Projected Benefits (PVFB)	Entry Age Actuarial Accrued Liability (AAL)	Entry Age Actuarial Accrued Liability (AAL)
Assets Value Used	Market Value (MV)	Actuarial Value Assets (AVA)	Market Value (MV)
UAAL Definition	PVFB + Expenses - EE cont - MV	AAL - AVA	AAL - MV
Amortization of UAAL	30, 20 years	10 years	30, 20, 10 Years
Projection Start Date	January 1, 2023	January 1, 2023	January 1, 2024
Wage Inflation	3.0%	3.5%	3.0%
Scenarios	Proposed Scenario only with different Amortization Periods	5 Scenarios (including baseline)	Baseline, Proposed Change at 7.5% Proposed Change at 6.8%
Projection Metrics	Total Cost, ERS and WRS breakout	Normal Cost, Member Rate, UAAL Payment Total Cost, ERS and WRS breakouts	ERS Amortization, ERS ER Normal Cost, ERS, EE Cont, WRS EE+ER Cont

As shown above, we have chosen to define the Unfunded Liability as the Actuarial Accrued Liability (on an entry age basis) less the Market Value of Asset as of January 1, 2024. We would have preferred the Projected Unit Credit basis for theoretical reasons, but the entry age values were more readily available than the Projected Unit Credit values and we don't think the difference between the two approaches would be large enough to affect decisions. The charts below provide the development of these estimated figures based on January 1, 2022 values and rolled forward to January 1, 2024. For Milwaukee City, we used the estimated Market Value as of January 1, 2023 (provided by CavMac) and rolled this forward with 7.5% and 6.8% for 2023. For Milwaukee County, we used the estimated Market Value as of November 30, 2022 (provided by the Investment Consultant for Milwaukee County) as a proxy for the Market Value as of January 1, 2023 and rolled this amount forward with 7.5% and 6.8% for 2023. For Contributions, Benefit Payments and Normal Cost, we estimated these amounts based on the 2022 actuarial valuations for Milwaukee City and Milwaukee County.

Note, this March 31, 2023 version of the report includes requested 5.8% interest rate Scenarios throughout Section D.

UAAL Estimates for Milwaukee City

Milwaukee City at 7.5% (Thousands)			
	Market Value	Actuarial Liability	Unfunded Liability
January 1, 2022	\$6,431,356	\$6,864,666	\$433,310
Contributions	122,000		(122,000)
Benefit Payments	(450,000)	(450,000)	-
Normal Cost		90,000	90,000
Interest	(625,356)	501,350	1,126,706
January 1, 2023	5,478,000	7,006,016	1,528,016
Contributions	122,000		(122,000)
Benefit Payments	(450,000)	(450,000)	-
Normal Cost		90,000	90,000
Interest	398,550	511,951	113,401
January 1, 2024	5,548,550	\$7,157,967	\$1,609,417

Milwaukee City at 6.8% (Thousands)			
	Market Value	Actuarial Liability	Unfunded Liability
January 1, 2022	\$6,431,356	\$7,501,735	\$1,070,379
Contributions	122,000		(122,000)
Benefit Payments	(450,000)	(450,000)	-
Normal Cost		105,300	105,300
Interest	(625,356)	498,398	1,123,754
January 1, 2023	5,478,000	7,655,433	2,177,433
Contributions	122,000		(122,000)
Benefit Payments	(450,000)	(450,000)	-
Normal Cost		105,300	105,300
Interest	361,352	508,850	147,498
January 1, 2024	5,511,352	\$7,819,583	\$2,308,231

Milwaukee City at 5.8% (Thousands)			
	Market Value	Actuarial Liability	Unfunded Liability
January 1, 2022	\$6,431,356	\$8,505,716	\$2,074,360
Contributions	122,000		(122,000)
Benefit Payments	(450,000)	(450,000)	-
Normal Cost		131,625	131,625
Interest	(625,356)	484,099	1,109,455
January 1, 2023	5,478,000	8,671,440	3,193,440
Contributions	122,000		(122,000)
Benefit Payments	(450,000)	(450,000)	-
Normal Cost		131,625	131,625
Interest	308,212	493,711	185,499
January 1, 2024	5,458,212	\$8,846,775	\$3,388,563

UAAL estimates for Milwaukee County

Milwaukee County at 7.5% (Thousands)			
	Market Value	Actuarial Liability	Unfunded Liability
January 1, 2022	\$1,970,367	\$2,301,217	\$330,850
Contributions	75,000		(75,000)
Benefit Payments	(200,000)	(200,000)	-
Normal Cost		18,000	18,000
Interest	(145,367)	165,766	311,133
January 1, 2023	1,700,000	2,284,983	584,983
Contributions	75,000		(75,000)
Benefit Payments	(200,000)	(200,000)	-
Normal Cost		18,000	18,000
Interest	122,813	164,549	41,736
January 1, 2024	1,697,813	\$2,267,532	\$569,720

Milwaukee County at 6.8% (Thousands)			
	Market Value	Actuarial Liability	Unfunded Liability
January 1, 2022	\$1,970,367	\$2,432,669	\$462,302
Contributions	75,000		(75,000)
Benefit Payments	(200,000)	(200,000)	-
Normal Cost		21,060	21,060
Interest	(145,367)	159,338	304,705
January 1, 2023	1,700,000	2,413,067	713,067
Contributions	75,000		(75,000)
Benefit Payments	(200,000)	(200,000)	-
Normal Cost		21,060	21,060
Interest	111,350	158,005	46,655
January 1, 2024	1,686,350	\$2,392,131	\$705,781

Milwaukee County at 5.8% (Thousands)			
	Market Value	Actuarial Liability	Unfunded Liability
January 1, 2022	\$1,970,367	\$2,715,230	\$744,863
Contributions	75,000		(75,000)
Benefit Payments	(200,000)	(200,000)	-
Normal Cost		26,325	26,325
Interest	(145,367)	152,447	297,814
January 1, 2023	1,700,000	2,694,002	994,002
Contributions	75,000		(75,000)
Benefit Payments	(200,000)	(200,000)	-
Normal Cost		26,325	26,325
Interest	94,975	151,216	56,241
January 1, 2024	1,669,975	\$2,671,542	\$1,001,567



Comparison of Scenarios

As requested by the Legislative Fiscal Bureau, we developed the following figures for each of the scenarios:

1. An amortization schedule of UAAL payments (for the Milwaukee plans)
2. Projected annual normal cost payments (for the Milwaukee plans)
3. Projected annual employee contributions (for the Milwaukee plans)
4. Projected annual employer and employee WRS contributions

In addition, we also added the following items to aid in the comparison:

5. Total Employer Cost (in dollars) – this is combined cost for both Milwaukee existing employees and WRS new hires
6. Total Employer Cost (as a % of payroll) – this is based on combined payroll for both Milwaukee existing employees and WRS new hires
7. Total Employee Cost (as a % of payroll) – this is based on combined payroll for both Milwaukee existing employees and WRS new hires
8. Total Normal Cost (as a % of payroll) – this will be a blend of the total normal cost for both Milwaukee existing employees and WRS new hires

These calculations were then performed for both Milwaukee City and County plans for the following scenarios:

- Scenario 1a – Baseline results (Milwaukee status quo) with 30-year amortization of UAAL
- Scenario 2a – Milwaukee new hires join WRS after 1/24, 7.5% rate of return for Milwaukee plans with 30-year amortization of UAAL
- Scenario 3a – Milwaukee new hires join WRS after 1/24, 6.8% rate of return for Milwaukee plans with 30-year amortization of UAAL
- Scenario 4a – Milwaukee new hires join WRS after 1/24, 5.8% rate of return for Milwaukee plans with 30-year amortization of UAAL
- Scenario 1b – Baseline results (Milwaukee status quo) with 20-year amortization of UAAL
- Scenario 2b – Milwaukee new hires join WRS after 1/24, 7.5% rate of return for Milwaukee plans with 20-year amortization of UAAL
- Scenario 3b – Milwaukee new hires join WRS after 1/24, 6.8% rate of return for Milwaukee plans with 20-year amortization of UAAL
- Scenario 4b – Milwaukee new hires join WRS after 1/24, 5.8% rate of return for Milwaukee plans with 20-year amortization of UAAL
- Scenario 1c – Baseline results (Milwaukee status quo) with 10-year amortization of UAAL
- Scenario 2c – Milwaukee new hires join WRS after 1/24, 7.5% rate of return for Milwaukee plans with 10-year amortization of UAAL
- Scenario 3c – Milwaukee new hires join WRS after 1/24, 6.8% rate of return for Milwaukee plans with 10-year amortization of UAAL
- Scenario 4c – Milwaukee new hires join WRS after 1/24, 5.8% rate of return for Milwaukee plans with 10-year amortization of UAAL

The UAAL payments were based on the level dollar amortization method of the Total Unfunded Actuarial Liability. As such, the figures shown for the Baseline scenario (status quo) ignore the current funding method for Milwaukee City and Milwaukee County. This was done for comparison purposes only.

Comparison of Scenarios

Normal Cost and Employee Contribution rates were assumed to be as follows:

Milwaukee City									
	Assumed 7.5% Rate			Assumed 6.8% Rate			Assumed 5.8% Rate		
	General	Policemen	Firemen	General	Policemen	Firemen	General	Policemen	Firemen
Total Normal Cost	9.43%	25.67%	28.20%	11.00%	30.00%	33.00%	13.75%	37.50%	41.25%
Member Rate	4.80%	7.00%	7.00%	4.80%	7.00%	7.00%	4.80%	7.00%	7.00%

Milwaukee County						
	Assumed 7.5% Rate		Assumed 6.8% Rate		Assumed 5.8% Rate	
	General	Public Safety	General	Public Safety	General	Public Safety
Total Normal Cost	8.88%	14.04%	10.40%	16.40%	13.00%	20.50%
Member Rate	4.44%	7.02%	5.20%	8.20%	5.80%	9.20%

Wisconsin Retirement System			
	Assumed 6.8% Rate		
	General	Protective with Soc Sec	Protective w/out Soc Sec
Total Normal Cost	13.60%	20.00%	24.90%
Member Rate	6.80%	6.80%	6.80%
Employer Rate	6.80%	13.20%	18.10%

It was assumed that all Milwaukee City Public Safety future hires would fall into the Protective without Social Security category and all Milwaukee County Public Safety future hires would fall in the Protective with Social Security category. In addition, for Milwaukee County, we assumed that the member rate would equal ½ of the total normal cost for all scenarios.

Milwaukee City

Scenario 1a – Baseline Results (Milwaukee Status Quo) with 30-Year Amortization of UAAL

Milwaukee City - UAAL 30 years				WRS	Total	Total	Total	Total
UAAL	Employer	Employee	WRS	Employer	Employer	Employee	Normal	
Payment	Normal Cost	Contribution	ER+EE	Cost	Cost	Cost	Cost	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
2024	\$ 131,369,053	\$ 61,543,209	\$ 34,248,096	\$ -	\$ 192,912,262	31.4%	5.6%	15.6%
2025	131,369,053	63,389,505	35,275,539	-	194,758,558	30.8%	5.6%	15.6%
2026	131,369,053	65,291,190	36,333,806	-	196,660,243	30.2%	5.6%	15.6%
2027	131,369,053	67,249,926	37,423,820	-	198,618,979	29.6%	5.6%	15.6%
2028	131,369,053	69,267,424	38,546,534	-	200,636,477	29.0%	5.6%	15.6%
2029	131,369,053	71,345,447	39,702,930	-	202,714,500	28.5%	5.6%	15.6%
2030	131,369,053	73,485,810	40,894,018	-	204,854,863	27.9%	5.6%	15.6%
2031	131,369,053	75,690,384	42,120,839	-	207,059,437	27.4%	5.6%	15.6%
2032	131,369,053	77,961,096	43,384,464	-	209,330,149	26.9%	5.6%	15.6%
2033	131,369,053	80,299,929	44,685,998	-	211,668,982	26.4%	5.6%	15.6%
2034	131,369,053	82,708,927	46,026,578	-	214,077,980	25.9%	5.6%	15.6%
2035	131,369,053	85,190,194	47,407,375	-	216,559,247	25.5%	5.6%	15.6%
2036	131,369,053	87,745,900	48,829,596	-	219,114,953	25.0%	5.6%	15.6%
2037	131,369,053	90,378,277	50,294,484	-	221,747,330	24.6%	5.6%	15.6%
2038	131,369,053	93,089,626	51,803,319	-	224,458,679	24.1%	5.6%	15.6%
2039	131,369,053	95,882,314	53,357,418	-	227,251,367	23.7%	5.6%	15.6%
2040	131,369,053	98,758,784	54,958,141	-	230,127,837	23.3%	5.6%	15.6%
2041	131,369,053	101,721,547	56,606,885	-	233,090,600	22.9%	5.6%	15.6%
2042	131,369,053	104,773,194	58,305,092	-	236,142,247	22.6%	5.6%	15.6%
2043	131,369,053	107,916,389	60,054,244	-	239,285,442	22.2%	5.6%	15.6%
2044	131,369,053	111,153,881	61,855,872	-	242,522,934	21.8%	5.6%	15.6%
2045	131,369,053	114,488,498	63,711,548	-	245,857,551	21.5%	5.6%	15.6%
2046	131,369,053	117,923,152	65,622,894	-	249,292,206	21.2%	5.6%	15.6%
2047	131,369,053	121,460,847	67,591,581	-	252,829,900	20.8%	5.6%	15.6%
2048	131,369,053	125,104,672	69,619,329	-	256,473,726	20.5%	5.6%	15.6%
2049	131,369,053	128,857,813	71,707,908	-	260,226,866	20.2%	5.6%	15.6%
2050	131,369,053	132,723,547	73,859,146	-	264,092,600	19.9%	5.6%	15.6%
2051	131,369,053	136,705,253	76,074,920	-	268,074,306	19.6%	5.6%	15.6%
2052	131,369,053	140,806,411	78,357,168	-	272,175,464	19.4%	5.6%	15.6%
2053	131,369,053	145,030,603	80,707,883	-	276,399,656	19.1%	5.6%	15.6%
2054	-	149,381,521	83,129,119	-	149,381,521	10.0%	5.6%	15.6%
2055	-	153,862,967	85,622,993	-	153,862,967	10.0%	5.6%	15.6%
2056	-	158,478,856	88,191,683	-	158,478,856	10.0%	5.6%	15.6%
2057	-	163,233,222	90,837,433	-	163,233,222	10.0%	5.6%	15.6%
2058	-	168,130,218	93,562,556	-	168,130,218	10.0%	5.6%	15.6%
2059	-	173,174,125	96,369,433	-	173,174,125	10.0%	5.6%	15.6%
2060	-	178,369,349	99,260,516	-	178,369,349	10.0%	5.6%	15.6%
2061	-	183,720,429	102,238,331	-	183,720,429	10.0%	5.6%	15.6%
2062	-	189,232,042	105,305,481	-	189,232,042	10.0%	5.6%	15.6%
2063	-	194,909,003	108,464,646	-	194,909,003	10.0%	5.6%	15.6%
2064	-	200,756,273	111,718,585	-	200,756,273	10.0%	5.6%	15.6%



Milwaukee City

Scenario 2a – Milwaukee New Hires Join WRS after 1/24, 7.5% Rate of Return for Milwaukee Plans with 30-Year Amortization of UAAL

	Milwaukee City - UAAL 30 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 131,369,053	\$ 61,543,209	\$34,248,096	\$ -	\$ 192,912,262	31.4%	5.6%	15.6%
2025	131,369,053	61,433,570	34,259,763	3,277,103	194,873,441	30.8%	5.6%	15.6%
2026	131,369,053	61,261,964	34,241,306	6,750,833	196,896,902	30.2%	5.6%	15.7%
2027	131,369,053	61,024,772	34,190,909	10,430,037	198,984,617	29.6%	5.7%	15.7%
2028	131,369,053	60,718,212	34,106,670	14,323,918	201,138,619	29.1%	5.7%	15.8%
2029	131,369,053	60,338,336	33,986,605	18,442,044	203,361,008	28.5%	5.7%	15.8%
2030	131,369,053	59,881,021	33,828,640	22,794,366	205,653,947	28.0%	5.8%	15.9%
2031	131,369,053	59,341,963	33,630,609	27,391,230	208,019,670	27.5%	5.8%	15.9%
2032	131,369,053	58,716,669	33,390,251	32,243,391	210,460,480	27.0%	5.8%	16.0%
2033	131,369,053	58,000,449	33,105,203	37,362,030	212,978,753	26.6%	5.8%	16.0%
2034	131,369,053	57,188,411	32,773,002	42,758,767	215,576,940	26.1%	5.9%	16.1%
2035	131,369,053	56,275,450	32,391,074	48,445,683	218,257,569	25.7%	5.9%	16.1%
2036	131,369,053	55,256,242	31,956,734	54,435,331	221,023,249	25.2%	5.9%	16.2%
2037	131,369,053	54,125,233	31,467,182	60,740,757	223,876,671	24.8%	6.0%	16.2%
2038	131,369,053	52,876,634	30,919,496	67,375,517	226,820,609	24.4%	6.0%	16.3%
2039	131,369,053	51,504,405	30,310,628	74,353,695	229,857,926	24.0%	6.0%	16.3%
2040	131,369,053	50,002,254	29,637,401	81,689,927	232,991,576	23.6%	6.1%	16.4%
2041	131,369,053	48,363,621	28,896,500	89,399,413	236,224,605	23.3%	6.1%	16.4%
2042	131,369,053	46,581,666	28,084,472	97,497,949	239,560,155	22.9%	6.1%	16.5%
2043	131,369,053	44,649,268	27,197,715	106,001,936	243,001,468	22.5%	6.1%	16.5%
2044	131,369,053	42,559,002	26,232,477	114,928,415	246,551,888	22.2%	6.2%	16.5%
2045	131,369,053	40,303,136	25,184,846	124,295,081	250,214,865	21.9%	6.2%	16.6%
2046	131,369,053	37,873,615	24,050,748	134,120,311	253,993,955	21.6%	6.2%	16.6%
2047	131,369,053	35,262,049	22,825,939	144,423,190	257,892,829	21.3%	6.3%	16.7%
2048	131,369,053	32,459,704	21,505,994	155,223,533	261,915,274	21.0%	6.3%	16.7%
2049	131,369,053	29,457,482	20,086,310	166,541,915	266,065,194	20.7%	6.3%	16.8%
2050	131,369,053	26,245,912	18,562,090	178,399,699	270,346,617	20.4%	6.4%	16.8%
2051	131,369,053	22,815,137	16,928,338	190,819,063	274,763,699	20.1%	6.4%	16.9%
2052	131,369,053	19,154,894	15,179,856	203,823,029	279,320,726	19.9%	6.4%	16.9%
2053	131,369,053	15,254,503	13,311,229	217,435,495	284,022,120	19.6%	6.4%	17.0%
2054	-	11,102,849	11,316,823	231,681,269	157,503,388	10.6%	6.5%	17.0%
2055	-	10,292,341	10,490,695	241,962,087	162,750,086	10.6%	6.5%	17.1%
2056	-	9,423,210	9,604,814	252,651,240	168,169,832	10.6%	6.5%	17.2%
2057	-	8,492,668	8,656,338	263,763,977	173,768,289	10.7%	6.6%	17.2%
2058	-	7,497,813	7,642,310	275,316,091	179,551,300	10.7%	6.6%	17.3%
2059	-	6,435,623	6,559,650	287,323,945	185,524,900	10.7%	6.6%	17.4%
2060	-	5,302,953	5,405,151	299,804,486	191,695,320	10.8%	6.7%	17.4%
2061	-	4,096,531	4,175,479	312,775,267	198,068,992	10.8%	6.7%	17.5%
2062	-	2,812,951	2,867,163	326,254,472	204,652,560	10.8%	6.7%	17.6%
2063	-	1,448,670	1,476,589	340,260,931	211,452,879	10.9%	6.8%	17.6%
2064	-	-	-	354,814,148	218,477,030	10.9%	6.8%	17.7%



Milwaukee City

Scenario 3a – Milwaukee New Hires Join WRS after 1/24, 6.8% Rate of Return for Milwaukee Plans with 30-Year Amortization of UAAL

	Milwaukee City - UAAL 30 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 176,340,890	\$ 77,827,731	\$34,248,096	\$ -	\$ 254,168,621	41.4%	5.6%	18.2%
2025	176,340,890	77,701,437	34,259,763	3,277,103	256,113,145	40.5%	5.6%	18.2%
2026	176,340,890	77,497,520	34,241,306	6,750,833	258,104,295	39.6%	5.6%	18.2%
2027	176,340,890	77,211,437	34,190,909	10,430,037	260,143,119	38.7%	5.7%	18.1%
2028	176,340,890	76,838,442	34,106,670	14,323,918	262,230,686	37.9%	5.7%	18.1%
2029	176,340,890	76,373,576	33,986,605	18,442,044	264,368,085	37.1%	5.7%	18.1%
2030	176,340,890	75,811,664	33,828,640	22,794,366	266,556,426	36.3%	5.8%	18.0%
2031	176,340,890	75,147,300	33,630,609	27,391,230	268,796,844	35.6%	5.8%	18.0%
2032	176,340,890	74,374,845	33,390,251	32,243,391	271,090,493	34.8%	5.8%	18.0%
2033	176,340,890	73,488,410	33,105,203	37,362,030	273,438,551	34.1%	5.8%	18.0%
2034	176,340,890	72,481,851	32,773,002	42,758,767	275,842,217	33.4%	5.9%	17.9%
2035	176,340,890	71,348,759	32,391,074	48,445,683	278,302,715	32.7%	5.9%	17.9%
2036	176,340,890	70,082,447	31,956,734	54,435,331	280,821,292	32.0%	5.9%	17.9%
2037	176,340,890	68,675,944	31,467,182	60,740,757	283,399,218	31.4%	6.0%	17.8%
2038	176,340,890	67,121,976	30,919,496	67,375,517	286,037,788	30.8%	6.0%	17.8%
2039	176,340,890	65,412,961	30,310,628	74,353,695	288,738,319	30.2%	6.0%	17.8%
2040	176,340,890	63,540,996	29,637,401	81,689,927	291,502,154	29.6%	6.1%	17.7%
2041	176,340,890	61,497,841	28,896,500	89,399,413	294,330,662	29.0%	6.1%	17.7%
2042	176,340,890	59,274,910	28,084,472	97,497,949	297,225,235	28.4%	6.1%	17.7%
2043	176,340,890	56,863,255	27,197,715	106,001,936	300,187,292	27.9%	6.1%	17.6%
2044	176,340,890	54,253,553	26,232,477	114,928,415	303,218,277	27.3%	6.2%	17.6%
2045	176,340,890	51,436,093	25,184,846	124,295,081	306,319,659	26.8%	6.2%	17.6%
2046	176,340,890	48,400,756	24,050,748	134,120,311	309,492,934	26.3%	6.2%	17.5%
2047	176,340,890	45,137,007	22,825,939	144,423,190	312,739,624	25.8%	6.3%	17.5%
2048	176,340,890	41,633,872	21,505,994	155,223,533	316,061,279	25.3%	6.3%	17.5%
2049	176,340,890	37,879,926	20,086,310	166,541,915	319,459,475	24.8%	6.3%	17.4%
2050	176,340,890	33,863,273	18,562,090	178,399,699	322,935,814	24.4%	6.4%	17.4%
2051	176,340,890	29,571,528	16,928,338	190,819,063	326,491,927	23.9%	6.4%	17.4%
2052	176,340,890	24,991,802	15,179,856	203,823,029	330,129,471	23.5%	6.4%	17.4%
2053	176,340,890	20,110,678	13,311,229	217,435,495	333,850,132	23.0%	6.4%	17.3%
2054	-	14,914,194	11,316,823	231,681,269	161,314,732	10.8%	6.5%	17.3%
2055	-	13,825,457	10,490,695	241,962,087	166,283,202	10.8%	6.5%	17.3%
2056	-	12,657,974	9,604,814	252,651,240	171,404,596	10.8%	6.5%	17.4%
2057	-	11,407,999	8,656,338	263,763,977	176,683,620	10.8%	6.6%	17.4%
2058	-	10,071,634	7,642,310	275,316,091	182,125,121	10.8%	6.6%	17.5%
2059	-	8,644,819	6,559,650	287,323,945	187,734,096	10.9%	6.6%	17.5%
2060	-	7,123,331	5,405,151	299,804,486	193,515,697	10.9%	6.7%	17.5%
2061	-	5,502,773	4,175,479	312,775,267	199,475,234	10.9%	6.7%	17.6%
2062	-	3,778,571	2,867,163	326,254,472	205,618,179	10.9%	6.7%	17.6%
2063	-	1,945,964	1,476,589	340,260,931	211,950,173	10.9%	6.8%	17.7%
2064	-	-	-	354,814,148	218,477,030	10.9%	6.8%	17.7%



Milwaukee City

Scenario 4a – Milwaukee New Hires Join WRS after 1/24, 5.8% Rate of Return for Milwaukee Plans with 30-Year Amortization of UAAL

	Milwaukee City - UAAL 30 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 234,232,526	\$ 105,622,538	\$34,248,096	\$ -	\$ 339,855,064	55.3%	5.6%	22.8%
2025	234,232,526	105,467,167	34,259,763	3,277,103	341,770,511	54.0%	5.6%	22.6%
2026	234,232,526	105,207,413	34,241,306	6,750,833	343,705,824	52.7%	5.6%	22.4%
2027	234,232,526	104,837,154	34,190,909	10,430,037	345,660,472	51.5%	5.7%	22.3%
2028	234,232,526	104,349,993	34,106,670	14,323,918	347,633,873	50.3%	5.7%	22.1%
2029	234,232,526	103,739,248	33,986,605	18,442,044	349,625,393	49.1%	5.7%	21.9%
2030	234,232,526	102,997,944	33,828,640	22,794,366	351,634,343	47.9%	5.8%	21.7%
2031	234,232,526	102,118,796	33,630,609	27,391,230	353,659,976	46.8%	5.8%	21.6%
2032	234,232,526	101,094,201	33,390,251	32,243,391	355,701,486	45.7%	5.8%	21.4%
2033	234,232,526	99,916,224	33,105,203	37,362,030	357,758,001	44.6%	5.8%	21.2%
2034	234,232,526	98,576,583	32,773,002	42,758,767	359,828,586	43.6%	5.9%	21.1%
2035	234,232,526	97,066,639	32,391,074	48,445,683	361,912,232	42.5%	5.9%	20.9%
2036	234,232,526	95,377,380	31,956,734	54,435,331	364,007,861	41.5%	5.9%	20.7%
2037	234,232,526	93,499,405	31,467,182	60,740,757	366,114,316	40.6%	6.0%	20.6%
2038	234,232,526	91,422,912	30,919,496	67,375,517	368,230,360	39.6%	6.0%	20.4%
2039	234,232,526	89,137,680	30,310,628	74,353,695	370,354,673	38.7%	6.0%	20.2%
2040	234,232,526	86,633,053	29,637,401	81,689,927	372,485,847	37.8%	6.1%	20.1%
2041	234,232,526	83,897,925	28,896,500	89,399,413	374,622,382	36.9%	6.1%	19.9%
2042	234,232,526	80,920,719	28,084,472	97,497,949	376,762,681	36.0%	6.1%	19.7%
2043	234,232,526	77,689,373	27,197,715	106,001,936	378,905,046	35.2%	6.1%	19.6%
2044	234,232,526	74,191,317	26,232,477	114,928,415	381,047,677	34.3%	6.2%	19.4%
2045	234,232,526	70,413,458	25,184,846	124,295,081	383,188,660	33.5%	6.2%	19.2%
2046	234,232,526	66,342,155	24,050,748	134,120,311	385,325,969	32.7%	6.2%	19.1%
2047	234,232,526	61,963,202	22,825,939	144,423,190	387,457,455	31.9%	6.3%	18.9%
2048	234,232,526	57,261,803	21,505,994	155,223,533	389,580,847	31.2%	6.3%	18.7%
2049	234,232,526	52,222,554	20,086,310	166,541,915	391,693,739	30.4%	6.3%	18.6%
2050	234,232,526	46,829,414	18,562,090	178,399,699	393,793,592	29.7%	6.4%	18.4%
2051	234,232,526	41,065,686	16,928,338	190,819,063	395,877,721	29.0%	6.4%	18.2%
2052	234,232,526	34,913,987	15,179,856	203,823,029	397,943,292	28.3%	6.4%	18.1%
2053	234,232,526	28,356,227	13,311,229	217,435,495	399,987,317	27.6%	6.4%	17.9%
2054	-	21,373,579	11,316,823	231,681,269	167,774,118	11.2%	6.5%	17.7%
2055	-	19,813,308	10,490,695	241,962,087	172,271,052	11.2%	6.5%	17.7%
2056	-	18,140,184	9,604,814	252,651,240	176,886,806	11.2%	6.5%	17.7%
2057	-	16,348,841	8,656,338	263,763,977	181,624,461	11.1%	6.6%	17.7%
2058	-	14,433,691	7,642,310	275,316,091	186,487,178	11.1%	6.6%	17.7%
2059	-	12,388,918	6,559,650	287,323,945	191,478,195	11.1%	6.6%	17.7%
2060	-	10,208,469	5,405,151	299,804,486	196,600,835	11.0%	6.7%	17.7%
2061	-	7,886,042	4,175,479	312,775,267	201,858,503	11.0%	6.7%	17.7%
2062	-	5,415,082	2,867,163	326,254,472	207,254,690	11.0%	6.7%	17.7%
2063	-	2,788,767	1,476,589	340,260,931	212,792,976	10.9%	6.8%	17.7%
2064	-	-	-	354,814,148	218,477,030	10.9%	6.8%	17.7%



Milwaukee City

Scenario 1b – Baseline Results (Milwaukee Status Quo) with 20-Year Amortization of UAAL

	Milwaukee City - UAAL 20 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 152,191,925	\$ 61,543,209	\$34,248,096	\$ -	\$ 213,735,134	34.8%	5.6%	15.6%
2025	152,191,925	63,389,505	35,275,539	-	215,581,430	34.1%	5.6%	15.6%
2026	152,191,925	65,291,190	36,333,806	-	217,483,115	33.4%	5.6%	15.6%
2027	152,191,925	67,249,926	37,423,820	-	219,441,851	32.7%	5.6%	15.6%
2028	152,191,925	69,267,424	38,546,534	-	221,459,348	32.0%	5.6%	15.6%
2029	152,191,925	71,345,447	39,702,930	-	223,537,371	31.4%	5.6%	15.6%
2030	152,191,925	73,485,810	40,894,018	-	225,677,735	30.8%	5.6%	15.6%
2031	152,191,925	75,690,384	42,120,839	-	227,882,309	30.1%	5.6%	15.6%
2032	152,191,925	77,961,096	43,384,464	-	230,153,020	29.6%	5.6%	15.6%
2033	152,191,925	80,299,929	44,685,998	-	232,491,853	29.0%	5.6%	15.6%
2034	152,191,925	82,708,927	46,026,578	-	234,900,851	28.4%	5.6%	15.6%
2035	152,191,925	85,190,194	47,407,375	-	237,382,119	27.9%	5.6%	15.6%
2036	152,191,925	87,745,900	48,829,596	-	239,937,825	27.4%	5.6%	15.6%
2037	152,191,925	90,378,277	50,294,484	-	242,570,202	26.9%	5.6%	15.6%
2038	152,191,925	93,089,626	51,803,319	-	245,281,550	26.4%	5.6%	15.6%
2039	152,191,925	95,882,314	53,357,418	-	248,074,239	25.9%	5.6%	15.6%
2040	152,191,925	98,758,784	54,958,141	-	250,950,708	25.4%	5.6%	15.6%
2041	152,191,925	101,721,547	56,606,885	-	253,913,472	25.0%	5.6%	15.6%
2042	152,191,925	104,773,194	58,305,092	-	256,965,118	24.6%	5.6%	15.6%
2043	152,191,925	107,916,389	60,054,244	-	260,108,314	24.1%	5.6%	15.6%
2044	-	111,153,881	61,855,872	-	111,153,881	10.0%	5.6%	15.6%
2045	-	114,488,498	63,711,548	-	114,488,498	10.0%	5.6%	15.6%
2046	-	117,923,152	65,622,894	-	117,923,152	10.0%	5.6%	15.6%
2047	-	121,460,847	67,591,581	-	121,460,847	10.0%	5.6%	15.6%
2048	-	125,104,672	69,619,329	-	125,104,672	10.0%	5.6%	15.6%
2049	-	128,857,813	71,707,908	-	128,857,813	10.0%	5.6%	15.6%
2050	-	132,723,547	73,859,146	-	132,723,547	10.0%	5.6%	15.6%
2051	-	136,705,253	76,074,920	-	136,705,253	10.0%	5.6%	15.6%
2052	-	140,806,411	78,357,168	-	140,806,411	10.0%	5.6%	15.6%
2053	-	145,030,603	80,707,883	-	145,030,603	10.0%	5.6%	15.6%
2054	-	149,381,521	83,129,119	-	149,381,521	10.0%	5.6%	15.6%
2055	-	153,862,967	85,622,993	-	153,862,967	10.0%	5.6%	15.6%
2056	-	158,478,856	88,191,683	-	158,478,856	10.0%	5.6%	15.6%
2057	-	163,233,222	90,837,433	-	163,233,222	10.0%	5.6%	15.6%
2058	-	168,130,218	93,562,556	-	168,130,218	10.0%	5.6%	15.6%
2059	-	173,174,125	96,369,433	-	173,174,125	10.0%	5.6%	15.6%
2060	-	178,369,349	99,260,516	-	178,369,349	10.0%	5.6%	15.6%
2061	-	183,720,429	102,238,331	-	183,720,429	10.0%	5.6%	15.6%
2062	-	189,232,042	105,305,481	-	189,232,042	10.0%	5.6%	15.6%
2063	-	194,909,003	108,464,646	-	194,909,003	10.0%	5.6%	15.6%
2064	-	200,756,273	111,718,585	-	200,756,273	10.0%	5.6%	15.6%



Milwaukee City

Scenario 2b – Milwaukee New Hires Join WRS after 1/24, 7.5% Rate of Return for Milwaukee Plans with 20-Year Amortization of UAAL

	Milwaukee City - UAAL 20 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 152,191,925	\$ 61,543,209	\$34,248,096	\$ -	\$ 213,735,134	34.8%	5.6%	15.6%
2025	152,191,925	61,433,570	34,259,763	3,277,103	215,696,313	34.1%	5.6%	15.6%
2026	152,191,925	61,261,964	34,241,306	6,750,833	217,719,774	33.4%	5.6%	15.7%
2027	152,191,925	61,024,772	34,190,909	10,430,037	219,807,488	32.7%	5.7%	15.7%
2028	152,191,925	60,718,212	34,106,670	14,323,918	221,961,491	32.1%	5.7%	15.8%
2029	152,191,925	60,338,336	33,986,605	18,442,044	224,183,879	31.5%	5.7%	15.8%
2030	152,191,925	59,881,021	33,828,640	22,794,366	226,476,819	30.9%	5.8%	15.9%
2031	152,191,925	59,341,963	33,630,609	27,391,230	228,842,541	30.3%	5.8%	15.9%
2032	152,191,925	58,716,669	33,390,251	32,243,391	231,283,351	29.7%	5.8%	16.0%
2033	152,191,925	58,000,449	33,105,203	37,362,030	233,801,624	29.2%	5.8%	16.0%
2034	152,191,925	57,188,411	32,773,002	42,758,767	236,399,811	28.6%	5.9%	16.1%
2035	152,191,925	56,275,450	32,391,074	48,445,683	239,080,441	28.1%	5.9%	16.1%
2036	152,191,925	55,256,242	31,956,734	54,435,331	241,846,121	27.6%	5.9%	16.2%
2037	152,191,925	54,125,233	31,467,182	60,740,757	244,699,542	27.1%	6.0%	16.2%
2038	152,191,925	52,876,634	30,919,496	67,375,517	247,643,480	26.6%	6.0%	16.3%
2039	152,191,925	51,504,405	30,310,628	74,353,695	250,680,797	26.2%	6.0%	16.3%
2040	152,191,925	50,002,254	29,637,401	81,689,927	253,814,447	25.7%	6.1%	16.4%
2041	152,191,925	48,363,621	28,896,500	89,399,413	257,047,476	25.3%	6.1%	16.4%
2042	152,191,925	46,581,666	28,084,472	97,497,949	260,383,026	24.9%	6.1%	16.5%
2043	152,191,925	44,649,268	27,197,715	106,001,936	263,824,340	24.5%	6.1%	16.5%
2044	-	42,559,002	26,232,477	114,928,415	115,182,835	10.4%	6.2%	16.5%
2045	-	40,303,136	25,184,846	124,295,081	118,845,812	10.4%	6.2%	16.6%
2046	-	37,873,615	24,050,748	134,120,311	122,624,902	10.4%	6.2%	16.6%
2047	-	35,262,049	22,825,939	144,423,190	126,523,776	10.4%	6.3%	16.7%
2048	-	32,459,704	21,505,994	155,223,533	130,546,221	10.4%	6.3%	16.7%
2049	-	29,457,482	20,086,310	166,541,915	134,696,140	10.5%	6.3%	16.8%
2050	-	26,245,912	18,562,090	178,399,699	138,977,564	10.5%	6.4%	16.8%
2051	-	22,815,137	16,928,338	190,819,063	143,394,646	10.5%	6.4%	16.9%
2052	-	19,154,894	15,179,856	203,823,029	147,951,673	10.5%	6.4%	16.9%
2053	-	15,254,503	13,311,229	217,435,495	152,653,067	10.5%	6.4%	17.0%
2054	-	11,102,849	11,316,823	231,681,269	157,503,388	10.6%	6.5%	17.0%
2055	-	10,292,341	10,490,695	241,962,087	162,750,086	10.6%	6.5%	17.1%
2056	-	9,423,210	9,604,814	252,651,240	168,169,832	10.6%	6.5%	17.2%
2057	-	8,492,668	8,656,338	263,763,977	173,768,289	10.7%	6.6%	17.2%
2058	-	7,497,813	7,642,310	275,316,091	179,551,300	10.7%	6.6%	17.3%
2059	-	6,435,623	6,559,650	287,323,945	185,524,900	10.7%	6.6%	17.4%
2060	-	5,302,953	5,405,151	299,804,486	191,695,320	10.8%	6.7%	17.4%
2061	-	4,096,531	4,175,479	312,775,267	198,068,992	10.8%	6.7%	17.5%
2062	-	2,812,951	2,867,163	326,254,472	204,652,560	10.8%	6.7%	17.6%
2063	-	1,448,670	1,476,589	340,260,931	211,452,879	10.9%	6.8%	17.6%
2064	-	-	-	354,814,148	218,477,030	10.9%	6.8%	17.7%



Milwaukee City

Scenario 3b – Milwaukee New Hires Join WRS after 1/24, 6.8% Rate of Return for Milwaukee Plans with 20-Year Amortization of UAAL

	Milwaukee City - UAAL 20 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 207,506,141	\$ 77,827,731	\$34,248,096	\$ -	\$ 285,333,872	46.4%	5.6%	18.2%
2025	207,506,141	77,701,437	34,259,763	3,277,103	287,278,396	45.4%	5.6%	18.2%
2026	207,506,141	77,497,520	34,241,306	6,750,833	289,269,546	44.4%	5.6%	18.2%
2027	207,506,141	77,211,437	34,190,909	10,430,037	291,308,371	43.4%	5.7%	18.1%
2028	207,506,141	76,838,442	34,106,670	14,323,918	293,395,937	42.4%	5.7%	18.1%
2029	207,506,141	76,373,576	33,986,605	18,442,044	295,533,336	41.5%	5.7%	18.1%
2030	207,506,141	75,811,664	33,828,640	22,794,366	297,721,678	40.6%	5.8%	18.0%
2031	207,506,141	75,147,300	33,630,609	27,391,230	299,962,096	39.7%	5.8%	18.0%
2032	207,506,141	74,374,845	33,390,251	32,243,391	302,255,744	38.8%	5.8%	18.0%
2033	207,506,141	73,488,410	33,105,203	37,362,030	304,603,802	38.0%	5.8%	18.0%
2034	207,506,141	72,481,851	32,773,002	42,758,767	307,007,468	37.2%	5.9%	17.9%
2035	207,506,141	71,348,759	32,391,074	48,445,683	309,467,967	36.4%	5.9%	17.9%
2036	207,506,141	70,082,447	31,956,734	54,435,331	311,986,544	35.6%	5.9%	17.9%
2037	207,506,141	68,675,944	31,467,182	60,740,757	314,564,470	34.9%	6.0%	17.8%
2038	207,506,141	67,121,976	30,919,496	67,375,517	317,203,039	34.1%	6.0%	17.8%
2039	207,506,141	65,412,961	30,310,628	74,353,695	319,903,570	33.4%	6.0%	17.8%
2040	207,506,141	63,540,996	29,637,401	81,689,927	322,667,405	32.7%	6.1%	17.7%
2041	207,506,141	61,497,841	28,896,500	89,399,413	325,495,913	32.0%	6.1%	17.7%
2042	207,506,141	59,274,910	28,084,472	97,497,949	328,390,487	31.4%	6.1%	17.7%
2043	207,506,141	56,863,255	27,197,715	106,001,936	331,352,544	30.7%	6.1%	17.6%
2044	-	54,253,553	26,232,477	114,928,415	126,877,387	11.4%	6.2%	17.6%
2045	-	51,436,093	25,184,846	124,295,081	129,978,769	11.4%	6.2%	17.6%
2046	-	48,400,756	24,050,748	134,120,311	133,152,044	11.3%	6.2%	17.5%
2047	-	45,137,007	22,825,939	144,423,190	136,398,734	11.2%	6.3%	17.5%
2048	-	41,633,872	21,505,994	155,223,533	139,720,389	11.2%	6.3%	17.5%
2049	-	37,879,926	20,086,310	166,541,915	143,118,585	11.1%	6.3%	17.4%
2050	-	33,863,273	18,562,090	178,399,699	146,594,924	11.1%	6.4%	17.4%
2051	-	29,571,528	16,928,338	190,819,063	150,151,037	11.0%	6.4%	17.4%
2052	-	24,991,802	15,179,856	203,823,029	153,788,581	10.9%	6.4%	17.4%
2053	-	20,110,678	13,311,229	217,435,495	157,509,242	10.9%	6.4%	17.3%
2054	-	14,914,194	11,316,823	231,681,269	161,314,732	10.8%	6.5%	17.3%
2055	-	13,825,457	10,490,695	241,962,087	166,283,202	10.8%	6.5%	17.3%
2056	-	12,657,974	9,604,814	252,651,240	171,404,596	10.8%	6.5%	17.4%
2057	-	11,407,999	8,656,338	263,763,977	176,683,620	10.8%	6.6%	17.4%
2058	-	10,071,634	7,642,310	275,316,091	182,125,121	10.8%	6.6%	17.5%
2059	-	8,644,819	6,559,650	287,323,945	187,734,096	10.9%	6.6%	17.5%
2060	-	7,123,331	5,405,151	299,804,486	193,515,697	10.9%	6.7%	17.5%
2061	-	5,502,773	4,175,479	312,775,267	199,475,234	10.9%	6.7%	17.6%
2062	-	3,778,571	2,867,163	326,254,472	205,618,179	10.9%	6.7%	17.6%
2063	-	1,945,964	1,476,589	340,260,931	211,950,173	10.9%	6.8%	17.7%
2064	-	-	-	354,814,148	218,477,030	10.9%	6.8%	17.7%



Milwaukee City

Scenario 4b – Milwaukee New Hires Join WRS after 1/24, 5.8% Rate of Return for Milwaukee Plans with 20-Year Amortization of UAAL

	Milwaukee City - UAAL 20 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 282,571,747	\$ 105,622,538	\$34,248,096	\$ -	\$ 388,194,284	63.2%	5.6%	22.8%
2025	282,571,747	105,467,167	34,259,763	3,277,103	390,109,731	61.6%	5.6%	22.6%
2026	282,571,747	105,207,413	34,241,306	6,750,833	392,045,045	60.1%	5.6%	22.4%
2027	282,571,747	104,837,154	34,190,909	10,430,037	393,999,693	58.7%	5.7%	22.3%
2028	282,571,747	104,349,993	34,106,670	14,323,918	395,973,094	57.2%	5.7%	22.1%
2029	282,571,747	103,739,248	33,986,605	18,442,044	397,964,613	55.9%	5.7%	21.9%
2030	282,571,747	102,997,944	33,828,640	22,794,366	399,973,563	54.5%	5.8%	21.7%
2031	282,571,747	102,118,796	33,630,609	27,391,230	401,999,196	53.2%	5.8%	21.6%
2032	282,571,747	101,094,201	33,390,251	32,243,391	404,040,706	51.9%	5.8%	21.4%
2033	282,571,747	99,916,224	33,105,203	37,362,030	406,097,222	50.6%	5.8%	21.2%
2034	282,571,747	98,576,583	32,773,002	42,758,767	408,167,806	49.4%	5.9%	21.1%
2035	282,571,747	97,066,639	32,391,074	48,445,683	410,251,452	48.2%	5.9%	20.9%
2036	282,571,747	95,377,380	31,956,734	54,435,331	412,347,081	47.1%	5.9%	20.7%
2037	282,571,747	93,499,405	31,467,182	60,740,757	414,453,536	45.9%	6.0%	20.6%
2038	282,571,747	91,422,912	30,919,496	67,375,517	416,569,580	44.8%	6.0%	20.4%
2039	282,571,747	89,137,680	30,310,628	74,353,695	418,693,894	43.7%	6.0%	20.2%
2040	282,571,747	86,633,053	29,637,401	81,689,927	420,825,068	42.7%	6.1%	20.1%
2041	282,571,747	83,897,925	28,896,500	89,399,413	422,961,602	41.6%	6.1%	19.9%
2042	282,571,747	80,920,719	28,084,472	97,497,949	425,101,901	40.6%	6.1%	19.7%
2043	282,571,747	77,689,373	27,197,715	106,001,936	427,244,267	39.6%	6.1%	19.6%
2044	-	74,191,317	26,232,477	114,928,415	429,385,682	38.6%	6.2%	19.4%
2045	-	70,413,458	25,184,846	124,295,081	431,580,763	37.6%	6.2%	19.2%
2046	-	66,342,155	24,050,748	134,120,311	433,832,874	36.6%	6.2%	19.1%
2047	-	61,963,202	22,825,939	144,423,190	436,148,064	35.6%	6.3%	18.9%
2048	-	57,261,803	21,505,994	155,223,533	438,529,597	34.6%	6.3%	18.7%
2049	-	52,222,554	20,086,310	166,541,915	440,971,512	33.6%	6.3%	18.6%
2050	-	46,829,414	18,562,090	178,399,699	443,474,911	32.6%	6.4%	18.4%
2051	-	41,065,686	16,928,338	190,819,063	446,040,974	31.6%	6.4%	18.2%
2052	-	34,913,987	15,179,856	203,823,029	448,669,003	30.6%	6.4%	18.1%
2053	-	28,356,227	13,311,229	217,435,495	451,359,508	29.6%	6.4%	17.9%
2054	-	21,373,579	11,316,823	231,681,269	454,113,777	28.6%	6.5%	17.7%
2055	-	19,813,308	10,490,695	241,962,087	456,933,864	27.6%	6.5%	17.7%
2056	-	18,140,184	9,604,814	252,651,240	459,828,048	26.6%	6.5%	17.7%
2057	-	16,348,841	8,656,338	263,763,977	462,792,025	25.6%	6.6%	17.7%
2058	-	14,433,691	7,642,310	275,316,091	465,825,616	24.6%	6.6%	17.7%
2059	-	12,388,918	6,559,650	287,323,945	468,928,561	23.6%	6.6%	17.7%
2060	-	10,208,469	5,405,151	299,804,486	472,092,057	22.6%	6.7%	17.7%
2061	-	7,886,042	4,175,479	312,775,267	475,316,536	21.6%	6.7%	17.7%
2062	-	5,415,082	2,867,163	326,254,472	478,599,009	20.6%	6.7%	17.7%
2063	-	2,788,767	1,476,589	340,260,931	481,940,940	19.6%	6.8%	17.7%
2064	-	-	-	354,814,148	485,345,088	18.6%	6.8%	17.7%



Milwaukee City

Scenario 1c – Baseline Results (Milwaukee Status Quo) with 10-Year Amortization of UAAL

	Milwaukee City - UAAL 10 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 226,034,522	\$ 61,543,209	\$34,248,096	\$ -	\$ 287,577,731	46.8%	5.6%	15.6%
2025	226,034,522	63,389,505	35,275,539	-	289,424,028	45.7%	5.6%	15.6%
2026	226,034,522	65,291,190	36,333,806	-	291,325,713	44.7%	5.6%	15.6%
2027	226,034,522	67,249,926	37,423,820	-	293,284,448	43.7%	5.6%	15.6%
2028	226,034,522	69,267,424	38,546,534	-	295,301,946	42.7%	5.6%	15.6%
2029	226,034,522	71,345,447	39,702,930	-	297,379,969	41.7%	5.6%	15.6%
2030	226,034,522	73,485,810	40,894,018	-	299,520,332	40.8%	5.6%	15.6%
2031	226,034,522	75,690,384	42,120,839	-	301,724,907	39.9%	5.6%	15.6%
2032	226,034,522	77,961,096	43,384,464	-	303,995,618	39.0%	5.6%	15.6%
2033	226,034,522	80,299,929	44,685,998	-	306,334,451	38.2%	5.6%	15.6%
2034	-	82,708,927	46,026,578	-	82,708,927	10.0%	5.6%	15.6%
2035	-	85,190,194	47,407,375	-	85,190,194	10.0%	5.6%	15.6%
2036	-	87,745,900	48,829,596	-	87,745,900	10.0%	5.6%	15.6%
2037	-	90,378,277	50,294,484	-	90,378,277	10.0%	5.6%	15.6%
2038	-	93,089,626	51,803,319	-	93,089,626	10.0%	5.6%	15.6%
2039	-	95,882,314	53,357,418	-	95,882,314	10.0%	5.6%	15.6%
2040	-	98,758,784	54,958,141	-	98,758,784	10.0%	5.6%	15.6%
2041	-	101,721,547	56,606,885	-	101,721,547	10.0%	5.6%	15.6%
2042	-	104,773,194	58,305,092	-	104,773,194	10.0%	5.6%	15.6%
2043	-	107,916,389	60,054,244	-	107,916,389	10.0%	5.6%	15.6%
2044	-	111,153,881	61,855,872	-	111,153,881	10.0%	5.6%	15.6%
2045	-	114,488,498	63,711,548	-	114,488,498	10.0%	5.6%	15.6%
2046	-	117,923,152	65,622,894	-	117,923,152	10.0%	5.6%	15.6%
2047	-	121,460,847	67,591,581	-	121,460,847	10.0%	5.6%	15.6%
2048	-	125,104,672	69,619,329	-	125,104,672	10.0%	5.6%	15.6%
2049	-	128,857,813	71,707,908	-	128,857,813	10.0%	5.6%	15.6%
2050	-	132,723,547	73,859,146	-	132,723,547	10.0%	5.6%	15.6%
2051	-	136,705,253	76,074,920	-	136,705,253	10.0%	5.6%	15.6%
2052	-	140,806,411	78,357,168	-	140,806,411	10.0%	5.6%	15.6%
2053	-	145,030,603	80,707,883	-	145,030,603	10.0%	5.6%	15.6%
2054	-	149,381,521	83,129,119	-	149,381,521	10.0%	5.6%	15.6%
2055	-	153,862,967	85,622,993	-	153,862,967	10.0%	5.6%	15.6%
2056	-	158,478,856	88,191,683	-	158,478,856	10.0%	5.6%	15.6%
2057	-	163,233,222	90,837,433	-	163,233,222	10.0%	5.6%	15.6%
2058	-	168,130,218	93,562,556	-	168,130,218	10.0%	5.6%	15.6%
2059	-	173,174,125	96,369,433	-	173,174,125	10.0%	5.6%	15.6%
2060	-	178,369,349	99,260,516	-	178,369,349	10.0%	5.6%	15.6%
2061	-	183,720,429	102,238,331	-	183,720,429	10.0%	5.6%	15.6%
2062	-	189,232,042	105,305,481	-	189,232,042	10.0%	5.6%	15.6%
2063	-	194,909,003	108,464,646	-	194,909,003	10.0%	5.6%	15.6%
2064	-	200,756,273	111,718,585	-	200,756,273	10.0%	5.6%	15.6%



Milwaukee City

Scenario 2c – Milwaukee New Hires Join WRS after 1/24, 7.5% Rate of Return for Milwaukee Plans with 10-Year Amortization of UAAL

	Milwaukee City - UAAL 10 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 226,034,522	\$ 61,543,209	\$34,248,096	\$ -	\$ 287,577,731	46.8%	5.6%	15.6%
2025	226,034,522	61,433,570	34,259,763	3,277,103	289,538,910	45.7%	5.6%	15.6%
2026	226,034,522	61,261,964	34,241,306	6,750,833	291,562,371	44.7%	5.6%	15.7%
2027	226,034,522	61,024,772	34,190,909	10,430,037	293,650,086	43.7%	5.7%	15.7%
2028	226,034,522	60,718,212	34,106,670	14,323,918	295,804,088	42.8%	5.7%	15.8%
2029	226,034,522	60,338,336	33,986,605	18,442,044	298,026,477	41.8%	5.7%	15.8%
2030	226,034,522	59,881,021	33,828,640	22,794,366	300,319,416	40.9%	5.8%	15.9%
2031	226,034,522	59,341,963	33,630,609	27,391,230	302,685,139	40.0%	5.8%	15.9%
2032	226,034,522	58,716,669	33,390,251	32,243,391	305,125,949	39.2%	5.8%	16.0%
2033	226,034,522	58,000,449	33,105,203	37,362,030	307,644,222	38.4%	5.8%	16.0%
2034	-	57,188,411	32,773,002	42,758,767	84,207,887	10.2%	5.9%	16.1%
2035	-	56,275,450	32,391,074	48,445,683	86,888,516	10.2%	5.9%	16.1%
2036	-	55,256,242	31,956,734	54,435,331	89,654,196	10.2%	5.9%	16.2%
2037	-	54,125,233	31,467,182	60,740,757	92,507,618	10.2%	6.0%	16.2%
2038	-	52,876,634	30,919,496	67,375,517	95,451,556	10.3%	6.0%	16.3%
2039	-	51,504,405	30,310,628	74,353,695	98,488,873	10.3%	6.0%	16.3%
2040	-	50,002,254	29,637,401	81,689,927	101,622,523	10.3%	6.1%	16.4%
2041	-	48,363,621	28,896,500	89,399,413	104,855,552	10.3%	6.1%	16.4%
2042	-	46,581,666	28,084,472	97,497,949	108,191,102	10.3%	6.1%	16.5%
2043	-	44,649,268	27,197,715	106,001,936	111,632,415	10.4%	6.1%	16.5%
2044	-	42,559,002	26,232,477	114,928,415	115,182,835	10.4%	6.2%	16.5%
2045	-	40,303,136	25,184,846	124,295,081	118,845,812	10.4%	6.2%	16.6%
2046	-	37,873,615	24,050,748	134,120,311	122,624,902	10.4%	6.2%	16.6%
2047	-	35,262,049	22,825,939	144,423,190	126,523,776	10.4%	6.3%	16.7%
2048	-	32,459,704	21,505,994	155,223,533	130,546,221	10.4%	6.3%	16.7%
2049	-	29,457,482	20,086,310	166,541,915	134,696,140	10.5%	6.3%	16.8%
2050	-	26,245,912	18,562,090	178,399,699	138,977,564	10.5%	6.4%	16.8%
2051	-	22,815,137	16,928,338	190,819,063	143,394,646	10.5%	6.4%	16.9%
2052	-	19,154,894	15,179,856	203,823,029	147,951,673	10.5%	6.4%	16.9%
2053	-	15,254,503	13,311,229	217,435,495	152,653,067	10.5%	6.4%	17.0%
2054	-	11,102,849	11,316,823	231,681,269	157,503,388	10.6%	6.5%	17.0%
2055	-	10,292,341	10,490,695	241,962,087	162,750,086	10.6%	6.5%	17.1%
2056	-	9,423,210	9,604,814	252,651,240	168,169,832	10.6%	6.5%	17.2%
2057	-	8,492,668	8,656,338	263,763,977	173,768,289	10.7%	6.6%	17.2%
2058	-	7,497,813	7,642,310	275,316,091	179,551,300	10.7%	6.6%	17.3%
2059	-	6,435,623	6,559,650	287,323,945	185,524,900	10.7%	6.6%	17.4%
2060	-	5,302,953	5,405,151	299,804,486	191,695,320	10.8%	6.7%	17.4%
2061	-	4,096,531	4,175,479	312,775,267	198,068,992	10.8%	6.7%	17.5%
2062	-	2,812,951	2,867,163	326,254,472	204,652,560	10.8%	6.7%	17.6%
2063	-	1,448,670	1,476,589	340,260,931	211,452,879	10.9%	6.8%	17.6%
2064	-	-	-	354,814,148	218,477,030	10.9%	6.8%	17.7%



Milwaukee City

Scenario 3c – Milwaukee New Hires Join WRS after 1/24, 6.8% Rate of Return for Milwaukee Plans with 10-Year Amortization of UAAL

	Milwaukee City - UAAL 10 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 314,983,857	\$ 77,827,731	\$34,248,096	\$ -	\$ 392,811,588	63.9%	5.6%	18.2%
2025	314,983,857	77,701,437	34,259,763	3,277,103	394,756,112	62.4%	5.6%	18.2%
2026	314,983,857	77,497,520	34,241,306	6,750,833	396,747,262	60.8%	5.6%	18.2%
2027	314,983,857	77,211,437	34,190,909	10,430,037	398,786,086	59.4%	5.7%	18.1%
2028	314,983,857	76,838,442	34,106,670	14,323,918	400,873,653	57.9%	5.7%	18.1%
2029	314,983,857	76,373,576	33,986,605	18,442,044	403,011,052	56.6%	5.7%	18.1%
2030	314,983,857	75,811,664	33,828,640	22,794,366	405,199,393	55.2%	5.8%	18.0%
2031	314,983,857	75,147,300	33,630,609	27,391,230	407,439,811	53.9%	5.8%	18.0%
2032	314,983,857	74,374,845	33,390,251	32,243,391	409,733,460	52.6%	5.8%	18.0%
2033	314,983,857	73,488,410	33,105,203	37,362,030	412,081,518	51.4%	5.8%	18.0%
2034	-	72,481,851	32,773,002	42,758,767	99,501,327	12.0%	5.9%	17.9%
2035	-	71,348,759	32,391,074	48,445,683	101,961,825	12.0%	5.9%	17.9%
2036	-	70,082,447	31,956,734	54,435,331	104,480,402	11.9%	5.9%	17.9%
2037	-	68,675,944	31,467,182	60,740,757	107,058,328	11.9%	6.0%	17.8%
2038	-	67,121,976	30,919,496	67,375,517	109,696,898	11.8%	6.0%	17.8%
2039	-	65,412,961	30,310,628	74,353,695	112,397,428	11.7%	6.0%	17.8%
2040	-	63,540,996	29,637,401	81,689,927	115,161,264	11.7%	6.1%	17.7%
2041	-	61,497,841	28,896,500	89,399,413	117,989,772	11.6%	6.1%	17.7%
2042	-	59,274,910	28,084,472	97,497,949	120,884,345	11.6%	6.1%	17.7%
2043	-	56,863,255	27,197,715	106,001,936	123,846,402	11.5%	6.1%	17.6%
2044	-	54,253,553	26,232,477	114,928,415	126,877,387	11.4%	6.2%	17.6%
2045	-	51,436,093	25,184,846	124,295,081	129,978,769	11.4%	6.2%	17.6%
2046	-	48,400,756	24,050,748	134,120,311	133,152,044	11.3%	6.2%	17.5%
2047	-	45,137,007	22,825,939	144,423,190	136,398,734	11.2%	6.3%	17.5%
2048	-	41,633,872	21,505,994	155,223,533	139,720,389	11.2%	6.3%	17.5%
2049	-	37,879,926	20,086,310	166,541,915	143,118,585	11.1%	6.3%	17.4%
2050	-	33,863,273	18,562,090	178,399,699	146,594,924	11.1%	6.4%	17.4%
2051	-	29,571,528	16,928,338	190,819,063	150,151,037	11.0%	6.4%	17.4%
2052	-	24,991,802	15,179,856	203,823,029	153,788,581	10.9%	6.4%	17.4%
2053	-	20,110,678	13,311,229	217,435,495	157,509,242	10.9%	6.4%	17.3%
2054	-	14,914,194	11,316,823	231,681,269	161,314,732	10.8%	6.5%	17.3%
2055	-	13,825,457	10,490,695	241,962,087	166,283,202	10.8%	6.5%	17.3%
2056	-	12,657,974	9,604,814	252,651,240	171,404,596	10.8%	6.5%	17.4%
2057	-	11,407,999	8,656,338	263,763,977	176,683,620	10.8%	6.6%	17.4%
2058	-	10,071,634	7,642,310	275,316,091	182,125,121	10.8%	6.6%	17.5%
2059	-	8,644,819	6,559,650	287,323,945	187,734,096	10.9%	6.6%	17.5%
2060	-	7,123,331	5,405,151	299,804,486	193,515,697	10.9%	6.7%	17.5%
2061	-	5,502,773	4,175,479	312,775,267	199,475,234	10.9%	6.7%	17.6%
2062	-	3,778,571	2,867,163	326,254,472	205,618,179	10.9%	6.7%	17.6%
2063	-	1,945,964	1,476,589	340,260,931	211,950,173	10.9%	6.8%	17.7%
2064	-	-	-	354,814,148	218,477,030	10.9%	6.8%	17.7%



Milwaukee City

Scenario 4c – Milwaukee New Hires Join WRS after 1/24, 5.8% Rate of Return for Milwaukee Plans with 10-Year Amortization of UAAL

	Milwaukee City - UAAL 10 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 443,366,568	\$ 105,622,538	\$34,248,096	\$ -	\$ 548,989,106	89.3%	5.6%	22.8%
2025	443,366,568	105,467,167	34,259,763	3,277,103	550,904,553	87.0%	5.6%	22.6%
2026	443,366,568	105,207,413	34,241,306	6,750,833	552,839,866	84.8%	5.6%	22.4%
2027	443,366,568	104,837,154	34,190,909	10,430,037	554,794,514	82.6%	5.7%	22.3%
2028	443,366,568	104,349,993	34,106,670	14,323,918	556,767,915	80.5%	5.7%	22.1%
2029	443,366,568	103,739,248	33,986,605	18,442,044	558,759,435	78.4%	5.7%	21.9%
2030	443,366,568	102,997,944	33,828,640	22,794,366	560,768,385	76.4%	5.8%	21.7%
2031	443,366,568	102,118,796	33,630,609	27,391,230	562,794,018	74.5%	5.8%	21.6%
2032	443,366,568	101,094,201	33,390,251	32,243,391	564,835,528	72.5%	5.8%	21.4%
2033	443,366,568	99,916,224	33,105,203	37,362,030	566,892,043	70.7%	5.8%	21.2%
2034	-	98,576,583	32,773,002	42,758,767	125,596,059	15.2%	5.9%	21.1%
2035	-	97,066,639	32,391,074	48,445,683	127,679,706	15.0%	5.9%	20.9%
2036	-	95,377,380	31,956,734	54,435,331	129,775,335	14.8%	5.9%	20.7%
2037	-	93,499,405	31,467,182	60,740,757	131,881,789	14.6%	6.0%	20.6%
2038	-	91,422,912	30,919,496	67,375,517	133,997,834	14.4%	6.0%	20.4%
2039	-	89,137,680	30,310,628	74,353,695	136,122,147	14.2%	6.0%	20.2%
2040	-	86,633,053	29,637,401	81,689,927	138,253,321	14.0%	6.1%	20.1%
2041	-	83,897,925	28,896,500	89,399,413	140,389,856	13.8%	6.1%	19.9%
2042	-	80,920,719	28,084,472	97,497,949	142,530,154	13.6%	6.1%	19.7%
2043	-	77,689,373	27,197,715	106,001,936	144,672,520	13.4%	6.1%	19.6%
2044	-	74,191,317	26,232,477	114,928,415	146,815,151	13.2%	6.2%	19.4%
2045	-	70,413,458	25,184,846	124,295,081	148,956,134	13.0%	6.2%	19.2%
2046	-	66,342,155	24,050,748	134,120,311	151,093,442	12.8%	6.2%	19.1%
2047	-	61,963,202	22,825,939	144,423,190	153,224,929	12.6%	6.3%	18.9%
2048	-	57,261,803	21,505,994	155,223,533	155,348,320	12.4%	6.3%	18.7%
2049	-	52,222,554	20,086,310	166,541,915	157,461,213	12.2%	6.3%	18.6%
2050	-	46,829,414	18,562,090	178,399,699	159,561,066	12.0%	6.4%	18.4%
2051	-	41,065,686	16,928,338	190,819,063	161,645,194	11.8%	6.4%	18.2%
2052	-	34,913,987	15,179,856	203,823,029	163,710,766	11.6%	6.4%	18.1%
2053	-	28,356,227	13,311,229	217,435,495	165,754,791	11.4%	6.4%	17.9%
2054	-	21,373,579	11,316,823	231,681,269	167,774,118	11.2%	6.5%	17.7%
2055	-	19,813,308	10,490,695	241,962,087	172,271,052	11.2%	6.5%	17.7%
2056	-	18,140,184	9,604,814	252,651,240	176,886,806	11.2%	6.5%	17.7%
2057	-	16,348,841	8,656,338	263,763,977	181,624,461	11.1%	6.6%	17.7%
2058	-	14,433,691	7,642,310	275,316,091	186,487,178	11.1%	6.6%	17.7%
2059	-	12,388,918	6,559,650	287,323,945	191,478,195	11.1%	6.6%	17.7%
2060	-	10,208,469	5,405,151	299,804,486	196,600,835	11.0%	6.7%	17.7%
2061	-	7,886,042	4,175,479	312,775,267	201,858,503	11.0%	6.7%	17.7%
2062	-	5,415,082	2,867,163	326,254,472	207,254,690	11.0%	6.7%	17.7%
2063	-	2,788,767	1,476,589	340,260,931	212,792,976	10.9%	6.8%	17.7%
2064	-	-	-	354,814,148	218,477,030	10.9%	6.8%	17.7%



Milwaukee County

Scenario 1a – Baseline Results (Milwaukee Status Quo) with 30-Year Amortization of UAAL

	Milwaukee County - UAAL 30 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 43,473,989	\$ 9,888,188	\$ 9,888,188	\$ -	\$ 53,362,177	25.2%	4.7%	9.3%
2025	43,473,989	10,167,631	10,167,631	-	53,641,620	24.6%	4.7%	9.3%
2026	43,473,989	10,460,535	10,460,535	-	53,934,524	24.0%	4.7%	9.3%
2027	43,473,989	10,765,044	10,765,044	-	54,239,033	23.5%	4.7%	9.3%
2028	43,473,989	11,083,943	11,083,943	-	54,557,932	23.0%	4.7%	9.3%
2029	43,473,989	11,418,160	11,418,160	-	54,892,149	22.4%	4.7%	9.3%
2030	43,473,989	11,769,553	11,769,553	-	55,243,542	21.9%	4.7%	9.3%
2031	43,473,989	12,135,799	12,135,799	-	55,609,788	21.4%	4.7%	9.3%
2032	43,473,989	12,515,971	12,515,971	-	55,989,960	20.9%	4.7%	9.3%
2033	43,473,989	12,913,782	12,913,782	-	56,387,771	20.4%	4.7%	9.3%
2034	43,473,989	13,327,376	13,327,376	-	56,801,365	19.9%	4.7%	9.3%
2035	43,473,989	13,760,466	13,760,466	-	57,234,455	19.4%	4.7%	9.3%
2036	43,473,989	14,212,588	14,212,588	-	57,686,577	18.9%	4.7%	9.3%
2037	43,473,989	14,684,205	14,684,205	-	58,158,194	18.5%	4.7%	9.3%
2038	43,473,989	15,175,319	15,175,319	-	58,649,308	18.0%	4.7%	9.3%
2039	43,473,989	15,687,785	15,687,785	-	59,161,774	17.6%	4.7%	9.3%
2040	43,473,989	16,218,819	16,218,819	-	59,692,808	17.2%	4.7%	9.3%
2041	43,473,989	16,769,814	16,769,814	-	60,243,803	16.8%	4.7%	9.3%
2042	43,473,989	17,340,768	17,340,768	-	60,814,757	16.4%	4.7%	9.3%
2043	43,473,989	17,933,540	17,933,540	-	61,407,528	16.0%	4.7%	9.3%
2044	43,473,989	18,561,213	18,561,213	-	62,035,202	15.6%	4.7%	9.3%
2045	43,473,989	19,210,856	19,210,856	-	62,684,845	15.2%	4.7%	9.3%
2046	43,473,989	19,883,236	19,883,236	-	63,357,225	14.9%	4.7%	9.3%
2047	43,473,989	20,579,149	20,579,149	-	64,053,138	14.5%	4.7%	9.3%
2048	43,473,989	21,299,419	21,299,419	-	64,773,408	14.2%	4.7%	9.3%
2049	43,473,989	22,044,899	22,044,899	-	65,518,888	13.9%	4.7%	9.3%
2050	43,473,989	22,816,470	22,816,470	-	66,290,459	13.6%	4.7%	9.3%
2051	43,473,989	23,615,047	23,615,047	-	67,089,036	13.3%	4.7%	9.3%
2052	43,473,989	24,441,574	24,441,574	-	67,915,563	13.0%	4.7%	9.3%
2053	43,473,989	25,297,029	25,297,029	-	68,771,018	12.7%	4.7%	9.3%
2054	-	26,182,425	26,182,425	-	26,182,425	4.7%	4.7%	9.3%
2055	-	27,098,810	27,098,810	-	27,098,810	4.7%	4.7%	9.3%
2056	-	28,047,268	28,047,268	-	28,047,268	4.7%	4.7%	9.3%
2057	-	29,028,922	29,028,922	-	29,028,922	4.7%	4.7%	9.3%
2058	-	30,044,935	30,044,935	-	30,044,935	4.7%	4.7%	9.3%
2059	-	31,096,507	31,096,507	-	31,096,507	4.7%	4.7%	9.3%
2060	-	32,184,885	32,184,885	-	32,184,885	4.7%	4.7%	9.3%
2061	-	33,311,356	33,311,356	-	33,311,356	4.7%	4.7%	9.3%
2062	-	34,477,253	34,477,253	-	34,477,253	4.7%	4.7%	9.3%
2063	-	35,683,957	35,683,957	-	35,683,957	4.7%	4.7%	9.3%
2064	-	36,932,896	36,932,896	-	36,932,896	4.7%	4.7%	9.3%



Milwaukee County

Scenario 2a – Milwaukee New Hires Join WRS after 1/24, 7.5% Rate of Return for Milwaukee Plans with 30-Year Amortization of UAAL

	Milwaukee County - UAAL 30 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 43,473,989	\$ 9,888,188	\$ 9,888,188	\$ -	\$ 53,362,177	25.2%	4.7%	9.3%
2025	43,473,989	8,982,552	8,982,552	3,597,863	54,326,751	24.9%	4.9%	9.9%
2026	43,473,989	8,290,908	8,290,908	6,586,922	55,188,854	24.6%	5.1%	10.3%
2027	43,473,989	7,709,742	7,709,742	9,275,807	56,005,400	24.3%	5.3%	10.7%
2028	43,473,989	7,213,058	7,213,058	11,751,892	56,795,813	23.9%	5.4%	11.0%
2029	43,473,989	6,767,899	6,767,899	14,118,054	57,580,612	23.5%	5.5%	11.3%
2030	43,473,989	6,970,936	6,970,936	14,568,457	58,017,773	23.0%	5.5%	11.3%
2031	43,473,989	6,345,485	6,345,485	17,579,219	58,957,350	22.7%	5.7%	11.6%
2032	43,473,989	5,945,817	5,945,817	19,946,790	59,788,373	22.3%	5.8%	11.9%
2033	43,473,989	5,554,041	5,554,041	22,343,956	60,642,670	21.9%	5.9%	12.1%
2034	43,473,989	5,191,508	5,191,508	24,700,254	61,504,967	21.5%	6.0%	12.3%
2035	43,473,989	4,844,293	4,844,293	27,069,234	62,389,175	21.1%	6.0%	12.5%
2036	43,473,989	4,516,575	4,516,575	29,436,806	63,292,147	20.8%	6.1%	12.6%
2037	43,473,989	4,192,569	4,192,569	31,852,293	64,223,739	20.4%	6.2%	12.8%
2038	43,473,989	3,882,490	3,882,490	34,284,691	65,178,048	20.0%	6.3%	12.9%
2039	43,473,989	3,587,729	3,587,729	36,735,409	66,157,198	19.7%	6.3%	13.1%
2040	43,473,989	3,302,252	3,302,252	39,214,313	67,160,283	19.3%	6.4%	13.2%
2041	43,473,989	3,025,130	3,025,130	41,728,448	68,190,037	19.0%	6.4%	13.3%
2042	43,473,989	2,767,969	2,767,969	44,242,584	69,239,751	18.6%	6.5%	13.4%
2043	43,473,989	2,525,197	2,525,197	46,779,267	70,315,576	18.3%	6.5%	13.5%
2044	43,473,989	2,296,815	2,296,815	49,378,227	71,438,163	18.0%	6.5%	13.6%
2045	43,473,989	2,067,134	2,067,134	52,047,828	72,596,170	17.6%	6.6%	13.6%
2046	43,473,989	1,860,420	1,860,420	54,716,729	73,776,782	17.3%	6.6%	13.7%
2047	43,473,989	1,674,378	1,674,378	57,394,319	74,982,581	17.0%	6.6%	13.8%
2048	43,473,989	1,506,940	1,506,940	60,089,374	76,216,063	16.7%	6.6%	13.8%
2049	43,473,989	1,356,246	1,356,246	62,810,130	77,479,649	16.4%	6.7%	13.9%
2050	43,473,989	1,220,622	1,220,622	65,564,351	78,775,699	16.1%	6.7%	13.9%
2051	43,473,989	1,098,560	1,098,560	68,359,382	80,106,526	15.8%	6.7%	13.9%
2052	43,473,989	988,704	988,704	71,202,212	81,474,405	15.5%	6.7%	14.0%
2053	43,473,989	889,833	889,833	74,099,515	82,881,585	15.3%	6.7%	14.0%
2054	-	800,850	800,850	77,057,702	40,856,312	7.3%	6.7%	14.0%
2055	-	720,765	720,765	80,082,954	42,348,787	7.3%	6.7%	14.0%
2056	-	648,688	648,688	83,181,267	43,887,249	7.3%	6.8%	14.0%
2057	-	583,820	583,820	86,358,481	45,473,931	7.3%	6.8%	14.1%
2058	-	525,438	525,438	89,620,309	47,111,085	7.3%	6.8%	14.1%
2059	-	472,894	472,894	92,972,374	48,800,982	7.3%	6.8%	14.1%
2060	-	425,604	425,604	96,420,225	50,545,924	7.3%	6.8%	14.1%
2061	-	383,044	383,044	99,969,370	52,348,249	7.3%	6.8%	14.1%
2062	-	344,740	344,740	103,625,291	54,210,334	7.3%	6.8%	14.1%
2063	-	310,266	310,266	107,393,469	56,134,602	7.3%	6.8%	14.1%
2064	-	279,239	279,239	111,279,405	58,123,528	7.3%	6.8%	14.1%



Milwaukee County

Scenario 3a – Milwaukee New Hires Join WRS after 1/24, 6.8% Rate of Return for Milwaukee Plans with 30-Year Amortization of UAAL

	Milwaukee County - UAAL 30 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 53,788,556	\$ 11,573,529	\$ 11,573,529	\$ -	\$ 65,362,085	30.8%	5.5%	10.9%
2025	53,788,556	10,513,537	10,513,537	3,597,863	66,172,302	30.4%	5.6%	11.3%
2026	53,788,556	9,704,009	9,704,009	6,586,922	66,916,521	29.8%	5.7%	11.6%
2027	53,788,556	9,023,789	9,023,789	9,275,807	67,634,013	29.3%	5.8%	11.8%
2028	53,788,556	8,442,450	8,442,450	11,751,892	68,339,772	28.8%	5.9%	12.1%
2029	53,788,556	7,921,418	7,921,418	14,118,054	69,048,698	28.2%	6.0%	12.2%
2030	53,788,556	8,159,061	8,159,061	14,568,457	69,520,465	27.6%	6.0%	12.2%
2031	53,788,556	7,427,009	7,427,009	17,579,219	70,353,441	27.0%	6.1%	12.5%
2032	53,788,556	6,959,221	6,959,221	19,946,790	71,116,343	26.5%	6.2%	12.6%
2033	53,788,556	6,500,670	6,500,670	22,343,956	71,903,866	26.0%	6.2%	12.8%
2034	53,788,556	6,076,347	6,076,347	24,700,254	72,704,373	25.4%	6.3%	12.9%
2035	53,788,556	5,669,954	5,669,954	27,069,234	73,529,402	24.9%	6.3%	13.0%
2036	53,788,556	5,286,379	5,286,379	29,436,806	74,376,518	24.4%	6.4%	13.1%
2037	53,788,556	4,907,150	4,907,150	31,852,293	75,252,887	23.9%	6.4%	13.2%
2038	53,788,556	4,544,221	4,544,221	34,284,691	76,154,345	23.4%	6.5%	13.3%
2039	53,788,556	4,199,221	4,199,221	36,735,409	77,083,256	22.9%	6.5%	13.4%
2040	53,788,556	3,865,087	3,865,087	39,214,313	78,037,685	22.4%	6.5%	13.5%
2041	53,788,556	3,540,733	3,540,733	41,728,448	79,020,206	22.0%	6.6%	13.6%
2042	53,788,556	3,239,741	3,239,741	44,242,584	80,026,090	21.5%	6.6%	13.6%
2043	53,788,556	2,955,591	2,955,591	46,779,267	81,060,537	21.1%	6.6%	13.7%
2044	53,788,556	2,688,284	2,688,284	49,378,227	82,144,198	20.6%	6.6%	13.8%
2045	53,788,556	2,419,455	2,419,455	52,047,828	83,263,059	20.2%	6.7%	13.8%
2046	53,788,556	2,177,510	2,177,510	54,716,729	84,408,438	19.8%	6.7%	13.9%
2047	53,788,556	1,959,759	1,959,759	57,394,319	85,582,529	19.4%	6.7%	13.9%
2048	53,788,556	1,763,783	1,763,783	60,089,374	86,787,473	19.0%	6.7%	13.9%
2049	53,788,556	1,587,405	1,587,405	62,810,130	88,025,374	18.6%	6.7%	14.0%
2050	53,788,556	1,428,664	1,428,664	65,564,351	89,298,308	18.3%	6.7%	14.0%
2051	53,788,556	1,285,798	1,285,798	68,359,382	90,608,331	17.9%	6.7%	14.0%
2052	53,788,556	1,157,218	1,157,218	71,202,212	91,957,486	17.5%	6.7%	14.0%
2053	53,788,556	1,041,496	1,041,496	74,099,515	93,347,815	17.2%	6.8%	14.0%
2054	-	937,347	937,347	77,057,702	40,992,808	7.3%	6.8%	14.1%
2055	-	843,612	843,612	80,082,954	42,471,634	7.3%	6.8%	14.1%
2056	-	759,251	759,251	83,181,267	43,997,811	7.3%	6.8%	14.1%
2057	-	683,326	683,326	86,358,481	45,573,437	7.3%	6.8%	14.1%
2058	-	614,993	614,993	89,620,309	47,200,640	7.3%	6.8%	14.1%
2059	-	553,494	553,494	92,972,374	48,881,582	7.3%	6.8%	14.1%
2060	-	498,144	498,144	96,420,225	50,618,464	7.3%	6.8%	14.1%
2061	-	448,330	448,330	99,969,370	52,413,535	7.3%	6.8%	14.1%
2062	-	403,497	403,497	103,625,291	54,269,091	7.3%	6.8%	14.1%
2063	-	363,147	363,147	107,393,469	56,187,483	7.3%	6.8%	14.1%
2064	-	326,833	326,833	111,279,405	58,171,122	7.3%	6.8%	14.1%



Milwaukee County

Scenario 4a – Milwaukee New Hires Join WRS after 1/24, 5.8% Rate of Return for Milwaukee Plans with 30-Year Amortization of UAAL

	Milwaukee County - UAAL 30 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 69,253,760	\$ 14,476,370	\$ 14,476,370	\$ -	\$ 83,730,129	39.5%	6.8%	13.7%
2025	69,253,760	13,150,513	13,150,513	3,597,863	84,274,482	38.7%	6.8%	13.7%
2026	69,253,760	12,137,942	12,137,942	6,586,922	84,815,658	37.8%	6.8%	13.8%
2027	69,253,760	11,287,110	11,287,110	9,275,807	85,362,539	37.0%	6.8%	13.8%
2028	69,253,760	10,559,962	10,559,962	11,751,892	85,922,488	36.2%	6.8%	13.8%
2029	69,253,760	9,908,247	9,908,247	14,118,054	86,500,730	35.3%	6.8%	13.9%
2030	69,253,760	10,205,494	10,205,494	14,568,457	87,032,102	34.5%	6.8%	13.9%
2031	69,253,760	9,289,831	9,289,831	17,579,219	87,681,466	33.7%	6.8%	13.9%
2032	69,253,760	8,704,714	8,704,714	19,946,790	88,327,040	32.9%	6.8%	13.9%
2033	69,253,760	8,131,150	8,131,150	22,343,956	88,999,550	32.1%	6.8%	13.9%
2034	69,253,760	7,600,400	7,600,400	24,700,254	89,693,630	31.4%	6.8%	14.0%
2035	69,253,760	7,092,076	7,092,076	27,069,234	90,416,728	30.6%	6.8%	14.0%
2036	69,253,760	6,612,294	6,612,294	29,436,806	91,167,637	29.9%	6.8%	14.0%
2037	69,253,760	6,137,948	6,137,948	31,852,293	91,948,888	29.2%	6.8%	14.0%
2038	69,253,760	5,683,990	5,683,990	34,284,691	92,759,318	28.5%	6.8%	14.0%
2039	69,253,760	5,252,458	5,252,458	36,735,409	93,601,697	27.8%	6.8%	14.0%
2040	69,253,760	4,834,518	4,834,518	39,214,313	94,472,319	27.2%	6.8%	14.1%
2041	69,253,760	4,428,810	4,428,810	41,728,448	95,373,487	26.5%	6.8%	14.1%
2042	69,253,760	4,052,323	4,052,323	44,242,584	96,303,877	25.9%	6.8%	14.1%
2043	69,253,760	3,696,904	3,696,904	46,779,267	97,267,054	25.3%	6.8%	14.1%
2044	69,253,760	3,362,552	3,362,552	49,378,227	98,283,670	24.7%	6.8%	14.1%
2045	69,253,760	3,026,297	3,026,297	52,047,828	99,335,104	24.1%	6.8%	14.1%
2046	69,253,760	2,723,667	2,723,667	54,716,729	100,419,799	23.6%	6.8%	14.1%
2047	69,253,760	2,451,300	2,451,300	57,394,319	101,539,274	23.0%	6.8%	14.1%
2048	69,253,760	2,206,170	2,206,170	60,089,374	102,695,064	22.5%	6.8%	14.1%
2049	69,253,760	1,985,553	1,985,553	62,810,130	103,888,727	22.0%	6.8%	14.1%
2050	69,253,760	1,786,998	1,786,998	65,564,351	105,121,846	21.5%	6.8%	14.1%
2051	69,253,760	1,608,298	1,608,298	68,359,382	106,396,035	21.0%	6.8%	14.1%
2052	69,253,760	1,447,468	1,447,468	71,202,212	107,712,940	20.6%	6.8%	14.1%
2053	69,253,760	1,302,721	1,302,721	74,099,515	109,074,244	20.1%	6.8%	14.1%
2054	-	1,172,449	1,172,449	77,057,702	41,227,911	7.3%	6.8%	14.1%
2055	-	1,055,204	1,055,204	80,082,954	42,683,227	7.3%	6.8%	14.1%
2056	-	949,684	949,684	83,181,267	44,188,244	7.3%	6.8%	14.1%
2057	-	854,716	854,716	86,358,481	45,744,827	7.4%	6.8%	14.2%
2058	-	769,244	769,244	89,620,309	47,354,891	7.4%	6.8%	14.2%
2059	-	692,320	692,320	92,972,374	49,020,407	7.4%	6.8%	14.2%
2060	-	623,088	623,088	96,420,225	50,743,408	7.4%	6.8%	14.2%
2061	-	560,779	560,779	99,969,370	52,525,984	7.4%	6.8%	14.2%
2062	-	504,701	504,701	103,625,291	54,370,295	7.4%	6.8%	14.2%
2063	-	454,231	454,231	107,393,469	56,278,567	7.4%	6.8%	14.2%
2064	-	408,808	408,808	111,279,405	58,253,097	7.4%	6.8%	14.2%



Milwaukee County

Scenario 1b – Baseline Results (Milwaukee Status Quo) with 20-Year Amortization of UAAL

	Milwaukee County - UAAL 20 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 51,157,277	\$ 9,888,188	\$ 9,888,188	\$ -	\$ 61,045,465	28.8%	4.7%	9.3%
2025	51,157,277	10,167,631	10,167,631	-	61,324,907	28.1%	4.7%	9.3%
2026	51,157,277	10,460,535	10,460,535	-	61,617,812	27.5%	4.7%	9.3%
2027	51,157,277	10,765,044	10,765,044	-	61,922,321	26.8%	4.7%	9.3%
2028	51,157,277	11,083,943	11,083,943	-	62,241,220	26.2%	4.7%	9.3%
2029	51,157,277	11,418,160	11,418,160	-	62,575,437	25.6%	4.7%	9.3%
2030	51,157,277	11,769,553	11,769,553	-	62,926,829	24.9%	4.7%	9.3%
2031	51,157,277	12,135,799	12,135,799	-	63,293,076	24.3%	4.7%	9.3%
2032	51,157,277	12,515,971	12,515,971	-	63,673,248	23.7%	4.7%	9.3%
2033	51,157,277	12,913,782	12,913,782	-	64,071,059	23.1%	4.7%	9.3%
2034	51,157,277	13,327,376	13,327,376	-	64,484,653	22.6%	4.7%	9.3%
2035	51,157,277	13,760,466	13,760,466	-	64,917,743	22.0%	4.7%	9.3%
2036	51,157,277	14,212,588	14,212,588	-	65,369,864	21.5%	4.7%	9.3%
2037	51,157,277	14,684,205	14,684,205	-	65,841,482	20.9%	4.7%	9.3%
2038	51,157,277	15,175,319	15,175,319	-	66,332,596	20.4%	4.7%	9.3%
2039	51,157,277	15,687,785	15,687,785	-	66,845,062	19.9%	4.7%	9.3%
2040	51,157,277	16,218,819	16,218,819	-	67,376,096	19.4%	4.7%	9.3%
2041	51,157,277	16,769,814	16,769,814	-	67,927,090	18.9%	4.7%	9.3%
2042	51,157,277	17,340,768	17,340,768	-	68,498,045	18.4%	4.7%	9.3%
2043	51,157,277	17,933,540	17,933,540	-	69,090,816	18.0%	4.7%	9.3%
2044	-	18,561,213	18,561,213	-	18,561,213	4.7%	4.7%	9.3%
2045	-	19,210,856	19,210,856	-	19,210,856	4.7%	4.7%	9.3%
2046	-	19,883,236	19,883,236	-	19,883,236	4.7%	4.7%	9.3%
2047	-	20,579,149	20,579,149	-	20,579,149	4.7%	4.7%	9.3%
2048	-	21,299,419	21,299,419	-	21,299,419	4.7%	4.7%	9.3%
2049	-	22,044,899	22,044,899	-	22,044,899	4.7%	4.7%	9.3%
2050	-	22,816,470	22,816,470	-	22,816,470	4.7%	4.7%	9.3%
2051	-	23,615,047	23,615,047	-	23,615,047	4.7%	4.7%	9.3%
2052	-	24,441,574	24,441,574	-	24,441,574	4.7%	4.7%	9.3%
2053	-	25,297,029	25,297,029	-	25,297,029	4.7%	4.7%	9.3%
2054	-	26,182,425	26,182,425	-	26,182,425	4.7%	4.7%	9.3%
2055	-	27,098,810	27,098,810	-	27,098,810	4.7%	4.7%	9.3%
2056	-	28,047,268	28,047,268	-	28,047,268	4.7%	4.7%	9.3%
2057	-	29,028,922	29,028,922	-	29,028,922	4.7%	4.7%	9.3%
2058	-	30,044,935	30,044,935	-	30,044,935	4.7%	4.7%	9.3%
2059	-	31,096,507	31,096,507	-	31,096,507	4.7%	4.7%	9.3%
2060	-	32,184,885	32,184,885	-	32,184,885	4.7%	4.7%	9.3%
2061	-	33,311,356	33,311,356	-	33,311,356	4.7%	4.7%	9.3%
2062	-	34,477,253	34,477,253	-	34,477,253	4.7%	4.7%	9.3%
2063	-	35,683,957	35,683,957	-	35,683,957	4.7%	4.7%	9.3%
2064	-	36,932,896	36,932,896	-	36,932,896	4.7%	4.7%	9.3%



Milwaukee County

Scenario 2b – Milwaukee New Hires Join WRS after 1/24, 7.5% Rate of Return for Milwaukee Plans with 20-Year Amortization of UAAL

	Milwaukee County - UAAL 20 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 51,157,277	\$ 9,888,188	\$ 9,888,188	\$ -	\$ 61,045,465	28.8%	4.7%	9.3%
2025	51,157,277	8,982,552	8,982,552	3,597,863	62,010,039	28.4%	4.9%	9.9%
2026	51,157,277	8,290,908	8,290,908	6,586,922	62,872,141	28.0%	5.1%	10.3%
2027	51,157,277	7,709,742	7,709,742	9,275,807	63,688,687	27.6%	5.3%	10.7%
2028	51,157,277	7,213,058	7,213,058	11,751,892	64,479,100	27.1%	5.4%	11.0%
2029	51,157,277	6,767,899	6,767,899	14,118,054	65,263,899	26.7%	5.5%	11.3%
2030	51,157,277	6,970,936	6,970,936	14,568,457	65,701,061	26.0%	5.5%	11.3%
2031	51,157,277	6,345,485	6,345,485	17,579,219	66,640,638	25.6%	5.7%	11.6%
2032	51,157,277	5,945,817	5,945,817	19,946,790	67,471,660	25.1%	5.8%	11.9%
2033	51,157,277	5,554,041	5,554,041	22,343,956	68,325,957	24.7%	5.9%	12.1%
2034	51,157,277	5,191,508	5,191,508	24,700,254	69,188,255	24.2%	6.0%	12.3%
2035	51,157,277	4,844,293	4,844,293	27,069,234	70,072,463	23.8%	6.0%	12.5%
2036	51,157,277	4,516,575	4,516,575	29,436,806	70,975,435	23.3%	6.1%	12.6%
2037	51,157,277	4,192,569	4,192,569	31,852,293	71,907,027	22.8%	6.2%	12.8%
2038	51,157,277	3,882,490	3,882,490	34,284,691	72,861,335	22.4%	6.3%	12.9%
2039	51,157,277	3,587,729	3,587,729	36,735,409	73,840,485	22.0%	6.3%	13.1%
2040	51,157,277	3,302,252	3,302,252	39,214,313	74,843,570	21.5%	6.4%	13.2%
2041	51,157,277	3,025,130	3,025,130	41,728,448	75,873,324	21.1%	6.4%	13.3%
2042	51,157,277	2,767,969	2,767,969	44,242,584	76,923,039	20.7%	6.5%	13.4%
2043	51,157,277	2,525,197	2,525,197	46,779,267	77,998,864	20.3%	6.5%	13.5%
2044	-	2,296,815	2,296,815	49,378,227	27,964,174	7.0%	6.5%	13.6%
2045	-	2,067,134	2,067,134	52,047,828	29,122,181	7.1%	6.6%	13.6%
2046	-	1,860,420	1,860,420	54,716,729	30,302,793	7.1%	6.6%	13.7%
2047	-	1,674,378	1,674,378	57,394,319	31,508,592	7.1%	6.6%	13.8%
2048	-	1,506,940	1,506,940	60,089,374	32,742,074	7.2%	6.6%	13.8%
2049	-	1,356,246	1,356,246	62,810,130	34,005,660	7.2%	6.7%	13.9%
2050	-	1,220,622	1,220,622	65,564,351	35,301,710	7.2%	6.7%	13.9%
2051	-	1,098,560	1,098,560	68,359,382	36,632,537	7.2%	6.7%	13.9%
2052	-	988,704	988,704	71,202,212	38,000,416	7.3%	6.7%	14.0%
2053	-	889,833	889,833	74,099,515	39,407,596	7.3%	6.7%	14.0%
2054	-	800,850	800,850	77,057,702	40,856,312	7.3%	6.7%	14.0%
2055	-	720,765	720,765	80,082,954	42,348,787	7.3%	6.7%	14.0%
2056	-	648,688	648,688	83,181,267	43,887,249	7.3%	6.8%	14.0%
2057	-	583,820	583,820	86,358,481	45,473,931	7.3%	6.8%	14.1%
2058	-	525,438	525,438	89,620,309	47,111,085	7.3%	6.8%	14.1%
2059	-	472,894	472,894	92,972,374	48,800,982	7.3%	6.8%	14.1%
2060	-	425,604	425,604	96,420,225	50,545,924	7.3%	6.8%	14.1%
2061	-	383,044	383,044	99,969,370	52,348,249	7.3%	6.8%	14.1%
2062	-	344,740	344,740	103,625,291	54,210,334	7.3%	6.8%	14.1%
2063	-	310,266	310,266	107,393,469	56,134,602	7.3%	6.8%	14.1%
2064	-	279,239	279,239	111,279,405	58,123,528	7.3%	6.8%	14.1%



Milwaukee County

Scenario 3b – Milwaukee New Hires Join WRS after 1/24, 6.8% Rate of Return for Milwaukee Plans with 20-Year Amortization of UAAL

	Milwaukee County - UAAL 20 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 63,294,768	\$ 11,573,529	\$ 11,573,529	\$ -	\$ 74,868,297	35.3%	5.5%	10.9%
2025	63,294,768	10,513,537	10,513,537	3,597,863	75,678,514	34.7%	5.6%	11.3%
2026	63,294,768	9,704,009	9,704,009	6,586,922	76,422,733	34.1%	5.7%	11.6%
2027	63,294,768	9,023,789	9,023,789	9,275,807	77,140,225	33.4%	5.8%	11.8%
2028	63,294,768	8,442,450	8,442,450	11,751,892	77,845,984	32.8%	5.9%	12.1%
2029	63,294,768	7,921,418	7,921,418	14,118,054	78,554,910	32.1%	6.0%	12.2%
2030	63,294,768	8,159,061	8,159,061	14,568,457	79,026,677	31.3%	6.0%	12.2%
2031	63,294,768	7,427,009	7,427,009	17,579,219	79,859,652	30.7%	6.1%	12.5%
2032	63,294,768	6,959,221	6,959,221	19,946,790	80,622,555	30.0%	6.2%	12.6%
2033	63,294,768	6,500,670	6,500,670	22,343,956	81,410,078	29.4%	6.2%	12.8%
2034	63,294,768	6,076,347	6,076,347	24,700,254	82,210,585	28.8%	6.3%	12.9%
2035	63,294,768	5,669,954	5,669,954	27,069,234	83,035,614	28.1%	6.3%	13.0%
2036	63,294,768	5,286,379	5,286,379	29,436,806	83,882,730	27.5%	6.4%	13.1%
2037	63,294,768	4,907,150	4,907,150	31,852,293	84,759,099	26.9%	6.4%	13.2%
2038	63,294,768	4,544,221	4,544,221	34,284,691	85,660,557	26.3%	6.5%	13.3%
2039	63,294,768	4,199,221	4,199,221	36,735,409	86,589,468	25.7%	6.5%	13.4%
2040	63,294,768	3,865,087	3,865,087	39,214,313	87,543,896	25.2%	6.5%	13.5%
2041	63,294,768	3,540,733	3,540,733	41,728,448	88,526,418	24.6%	6.6%	13.6%
2042	63,294,768	3,239,741	3,239,741	44,242,584	89,532,302	24.1%	6.6%	13.6%
2043	63,294,768	2,955,591	2,955,591	46,779,267	90,566,749	23.6%	6.6%	13.7%
2044	-	2,688,284	2,688,284	49,378,227	28,355,643	7.1%	6.6%	13.8%
2045	-	2,419,455	2,419,455	52,047,828	29,474,503	7.2%	6.7%	13.8%
2046	-	2,177,510	2,177,510	54,716,729	30,619,882	7.2%	6.7%	13.9%
2047	-	1,959,759	1,959,759	57,394,319	31,793,973	7.2%	6.7%	13.9%
2048	-	1,763,783	1,763,783	60,089,374	32,998,917	7.2%	6.7%	13.9%
2049	-	1,587,405	1,587,405	62,810,130	34,236,819	7.2%	6.7%	14.0%
2050	-	1,428,664	1,428,664	65,564,351	35,509,753	7.3%	6.7%	14.0%
2051	-	1,285,798	1,285,798	68,359,382	36,819,775	7.3%	6.7%	14.0%
2052	-	1,157,218	1,157,218	71,202,212	38,168,930	7.3%	6.7%	14.0%
2053	-	1,041,496	1,041,496	74,099,515	39,559,259	7.3%	6.8%	14.0%
2054	-	937,347	937,347	77,057,702	40,992,808	7.3%	6.8%	14.1%
2055	-	843,612	843,612	80,082,954	42,471,634	7.3%	6.8%	14.1%
2056	-	759,251	759,251	83,181,267	43,997,811	7.3%	6.8%	14.1%
2057	-	683,326	683,326	86,358,481	45,573,437	7.3%	6.8%	14.1%
2058	-	614,993	614,993	89,620,309	47,200,640	7.3%	6.8%	14.1%
2059	-	553,494	553,494	92,972,374	48,881,582	7.3%	6.8%	14.1%
2060	-	498,144	498,144	96,420,225	50,618,464	7.3%	6.8%	14.1%
2061	-	448,330	448,330	99,969,370	52,413,535	7.3%	6.8%	14.1%
2062	-	403,497	403,497	103,625,291	54,269,091	7.3%	6.8%	14.1%
2063	-	363,147	363,147	107,393,469	56,187,483	7.3%	6.8%	14.1%
2064	-	326,833	326,833	111,279,405	58,171,122	7.3%	6.8%	14.1%



Milwaukee County

Scenario 4b – Milwaukee New Hires Join WRS after 1/24, 5.8% Rate of Return for Milwaukee Plans with 20-Year Amortization of UAAL

	Milwaukee County - UAAL 20 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 83,545,851	\$ 14,476,370	\$ 14,476,370	\$ -	\$ 98,022,221	46.2%	6.8%	13.7%
2025	83,545,851	13,150,513	13,150,513	3,597,863	98,566,574	45.2%	6.8%	13.7%
2026	83,545,851	12,137,942	12,137,942	6,586,922	99,107,750	44.2%	6.8%	13.8%
2027	83,545,851	11,287,110	11,287,110	9,275,807	99,654,631	43.2%	6.8%	13.8%
2028	83,545,851	10,559,962	10,559,962	11,751,892	100,214,579	42.2%	6.8%	13.8%
2029	83,545,851	9,908,247	9,908,247	14,118,054	100,792,822	41.2%	6.8%	13.9%
2030	83,545,851	10,205,494	10,205,494	14,568,457	101,324,193	40.2%	6.8%	13.9%
2031	83,545,851	9,289,831	9,289,831	17,579,219	101,973,558	39.2%	6.8%	13.9%
2032	83,545,851	8,704,714	8,704,714	19,946,790	102,619,132	38.2%	6.8%	13.9%
2033	83,545,851	8,131,150	8,131,150	22,343,956	103,291,642	37.3%	6.8%	13.9%
2034	83,545,851	7,600,400	7,600,400	24,700,254	103,985,721	36.4%	6.8%	14.0%
2035	83,545,851	7,092,076	7,092,076	27,069,234	104,708,820	35.5%	6.8%	14.0%
2036	83,545,851	6,612,294	6,612,294	29,436,806	105,459,728	34.6%	6.8%	14.0%
2037	83,545,851	6,137,948	6,137,948	31,852,293	106,240,980	33.7%	6.8%	14.0%
2038	83,545,851	5,683,990	5,683,990	34,284,691	107,051,410	32.9%	6.8%	14.0%
2039	83,545,851	5,252,458	5,252,458	36,735,409	107,893,789	32.1%	6.8%	14.0%
2040	83,545,851	4,834,518	4,834,518	39,214,313	108,764,411	31.3%	6.8%	14.1%
2041	83,545,851	4,428,810	4,428,810	41,728,448	109,665,579	30.5%	6.8%	14.1%
2042	83,545,851	4,052,323	4,052,323	44,242,584	110,595,968	29.7%	6.8%	14.1%
2043	83,545,851	3,696,904	3,696,904	46,779,267	111,559,146	29.0%	6.8%	14.1%
2044	-	3,362,552	3,362,552	49,378,227	29,029,911	7.3%	6.8%	14.1%
2045	-	3,026,297	3,026,297	52,047,828	30,081,344	7.3%	6.8%	14.1%
2046	-	2,723,667	2,723,667	54,716,729	31,166,039	7.3%	6.8%	14.1%
2047	-	2,451,300	2,451,300	57,394,319	32,285,514	7.3%	6.8%	14.1%
2048	-	2,206,170	2,206,170	60,089,374	33,441,304	7.3%	6.8%	14.1%
2049	-	1,985,553	1,985,553	62,810,130	34,634,967	7.3%	6.8%	14.1%
2050	-	1,786,998	1,786,998	65,564,351	35,868,086	7.3%	6.8%	14.1%
2051	-	1,608,298	1,608,298	68,359,382	37,142,275	7.3%	6.8%	14.1%
2052	-	1,447,468	1,447,468	71,202,212	38,459,180	7.3%	6.8%	14.1%
2053	-	1,302,721	1,302,721	74,099,515	39,820,485	7.3%	6.8%	14.1%
2054	-	1,172,449	1,172,449	77,057,702	41,227,911	7.3%	6.8%	14.1%
2055	-	1,055,204	1,055,204	80,082,954	42,683,227	7.3%	6.8%	14.1%
2056	-	949,684	949,684	83,181,267	44,188,244	7.3%	6.8%	14.1%
2057	-	854,716	854,716	86,358,481	45,744,827	7.4%	6.8%	14.2%
2058	-	769,244	769,244	89,620,309	47,354,891	7.4%	6.8%	14.2%
2059	-	692,320	692,320	92,972,374	49,020,407	7.4%	6.8%	14.2%
2060	-	623,088	623,088	96,420,225	50,743,408	7.4%	6.8%	14.2%
2061	-	560,779	560,779	99,969,370	52,525,984	7.4%	6.8%	14.2%
2062	-	504,701	504,701	103,625,291	54,370,295	7.4%	6.8%	14.2%
2063	-	454,231	454,231	107,393,469	56,278,567	7.4%	6.8%	14.2%
2064	-	408,808	408,808	111,279,405	58,253,097	7.4%	6.8%	14.2%



Milwaukee County

Scenario 1c – Baseline Results (Milwaukee Status Quo) with 10-Year Amortization of UAAL

	Milwaukee County - UAAL 10 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 77,654,166	\$ 9,888,188	\$ 9,888,188	\$ -	\$ 87,542,354	41.3%	4.7%	9.3%
2025	77,654,166	10,167,631	10,167,631	-	87,821,797	40.3%	4.7%	9.3%
2026	77,654,166	10,460,535	10,460,535	-	88,114,701	39.3%	4.7%	9.3%
2027	77,654,166	10,765,044	10,765,044	-	88,419,210	38.3%	4.7%	9.3%
2028	77,654,166	11,083,943	11,083,943	-	88,738,109	37.3%	4.7%	9.3%
2029	77,654,166	11,418,160	11,418,160	-	89,072,326	36.4%	4.7%	9.3%
2030	77,654,166	11,769,553	11,769,553	-	89,423,718	35.4%	4.7%	9.3%
2031	77,654,166	12,135,799	12,135,799	-	89,789,965	34.5%	4.7%	9.3%
2032	77,654,166	12,515,971	12,515,971	-	90,170,137	33.6%	4.7%	9.3%
2033	77,654,166	12,913,782	12,913,782	-	90,567,948	32.7%	4.7%	9.3%
2034	-	13,327,376	13,327,376	-	13,327,376	4.7%	4.7%	9.3%
2035	-	13,760,466	13,760,466	-	13,760,466	4.7%	4.7%	9.3%
2036	-	14,212,588	14,212,588	-	14,212,588	4.7%	4.7%	9.3%
2037	-	14,684,205	14,684,205	-	14,684,205	4.7%	4.7%	9.3%
2038	-	15,175,319	15,175,319	-	15,175,319	4.7%	4.7%	9.3%
2039	-	15,687,785	15,687,785	-	15,687,785	4.7%	4.7%	9.3%
2040	-	16,218,819	16,218,819	-	16,218,819	4.7%	4.7%	9.3%
2041	-	16,769,814	16,769,814	-	16,769,814	4.7%	4.7%	9.3%
2042	-	17,340,768	17,340,768	-	17,340,768	4.7%	4.7%	9.3%
2043	-	17,933,540	17,933,540	-	17,933,540	4.7%	4.7%	9.3%
2044	-	18,561,213	18,561,213	-	18,561,213	4.7%	4.7%	9.3%
2045	-	19,210,856	19,210,856	-	19,210,856	4.7%	4.7%	9.3%
2046	-	19,883,236	19,883,236	-	19,883,236	4.7%	4.7%	9.3%
2047	-	20,579,149	20,579,149	-	20,579,149	4.7%	4.7%	9.3%
2048	-	21,299,419	21,299,419	-	21,299,419	4.7%	4.7%	9.3%
2049	-	22,044,899	22,044,899	-	22,044,899	4.7%	4.7%	9.3%
2050	-	22,816,470	22,816,470	-	22,816,470	4.7%	4.7%	9.3%
2051	-	23,615,047	23,615,047	-	23,615,047	4.7%	4.7%	9.3%
2052	-	24,441,574	24,441,574	-	24,441,574	4.7%	4.7%	9.3%
2053	-	25,297,029	25,297,029	-	25,297,029	4.7%	4.7%	9.3%
2054	-	26,182,425	26,182,425	-	26,182,425	4.7%	4.7%	9.3%
2055	-	27,098,810	27,098,810	-	27,098,810	4.7%	4.7%	9.3%
2056	-	28,047,268	28,047,268	-	28,047,268	4.7%	4.7%	9.3%
2057	-	29,028,922	29,028,922	-	29,028,922	4.7%	4.7%	9.3%
2058	-	30,044,935	30,044,935	-	30,044,935	4.7%	4.7%	9.3%
2059	-	31,096,507	31,096,507	-	31,096,507	4.7%	4.7%	9.3%
2060	-	32,184,885	32,184,885	-	32,184,885	4.7%	4.7%	9.3%
2061	-	33,311,356	33,311,356	-	33,311,356	4.7%	4.7%	9.3%
2062	-	34,477,253	34,477,253	-	34,477,253	4.7%	4.7%	9.3%
2063	-	35,683,957	35,683,957	-	35,683,957	4.7%	4.7%	9.3%
2064	-	36,932,896	36,932,896	-	36,932,896	4.7%	4.7%	9.3%



Milwaukee County

Scenario 2c – Milwaukee New Hires Join WRS after 1/24, 7.5% Rate of Return for Milwaukee Plans with 10-Year Amortization of UAAL

	Milwaukee County - UAAL 10 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 77,654,166	\$ 9,888,188	\$ 9,888,188	\$ -	\$ 87,542,354	41.3%	4.7%	9.3%
2025	77,654,166	8,982,552	8,982,552	3,597,863	88,506,928	40.6%	4.9%	9.9%
2026	77,654,166	8,290,908	8,290,908	6,586,922	89,369,030	39.9%	5.1%	10.3%
2027	77,654,166	7,709,742	7,709,742	9,275,807	90,185,576	39.1%	5.3%	10.7%
2028	77,654,166	7,213,058	7,213,058	11,751,892	90,975,990	38.3%	5.4%	11.0%
2029	77,654,166	6,767,899	6,767,899	14,118,054	91,760,789	37.5%	5.5%	11.3%
2030	77,654,166	6,970,936	6,970,936	14,568,457	92,197,950	36.5%	5.5%	11.3%
2031	77,654,166	6,345,485	6,345,485	17,579,219	93,137,527	35.8%	5.7%	11.6%
2032	77,654,166	5,945,817	5,945,817	19,946,790	93,968,550	35.0%	5.8%	11.9%
2033	77,654,166	5,554,041	5,554,041	22,343,956	94,822,847	34.2%	5.9%	12.1%
2034	-	5,191,508	5,191,508	24,700,254	18,030,978	6.3%	6.0%	12.3%
2035	-	4,844,293	4,844,293	27,069,234	18,915,186	6.4%	6.0%	12.5%
2036	-	4,516,575	4,516,575	29,436,806	19,818,158	6.5%	6.1%	12.6%
2037	-	4,192,569	4,192,569	31,852,293	20,749,750	6.6%	6.2%	12.8%
2038	-	3,882,490	3,882,490	34,284,691	21,704,059	6.7%	6.3%	12.9%
2039	-	3,587,729	3,587,729	36,735,409	22,683,209	6.7%	6.3%	13.1%
2040	-	3,302,252	3,302,252	39,214,313	23,686,294	6.8%	6.4%	13.2%
2041	-	3,025,130	3,025,130	41,728,448	24,716,048	6.9%	6.4%	13.3%
2042	-	2,767,969	2,767,969	44,242,584	25,765,762	6.9%	6.5%	13.4%
2043	-	2,525,197	2,525,197	46,779,267	26,841,587	7.0%	6.5%	13.5%
2044	-	2,296,815	2,296,815	49,378,227	27,964,174	7.0%	6.5%	13.6%
2045	-	2,067,134	2,067,134	52,047,828	29,122,181	7.1%	6.6%	13.6%
2046	-	1,860,420	1,860,420	54,716,729	30,302,793	7.1%	6.6%	13.7%
2047	-	1,674,378	1,674,378	57,394,319	31,508,592	7.1%	6.6%	13.8%
2048	-	1,506,940	1,506,940	60,089,374	32,742,074	7.2%	6.6%	13.8%
2049	-	1,356,246	1,356,246	62,810,130	34,005,660	7.2%	6.7%	13.9%
2050	-	1,220,622	1,220,622	65,564,351	35,301,710	7.2%	6.7%	13.9%
2051	-	1,098,560	1,098,560	68,359,382	36,632,537	7.2%	6.7%	13.9%
2052	-	988,704	988,704	71,202,212	38,000,416	7.3%	6.7%	14.0%
2053	-	889,833	889,833	74,099,515	39,407,596	7.3%	6.7%	14.0%
2054	-	800,850	800,850	77,057,702	40,856,312	7.3%	6.7%	14.0%
2055	-	720,765	720,765	80,082,954	42,348,787	7.3%	6.7%	14.0%
2056	-	648,688	648,688	83,181,267	43,887,249	7.3%	6.8%	14.0%
2057	-	583,820	583,820	86,358,481	45,473,931	7.3%	6.8%	14.1%
2058	-	525,438	525,438	89,620,309	47,111,085	7.3%	6.8%	14.1%
2059	-	472,894	472,894	92,972,374	48,800,982	7.3%	6.8%	14.1%
2060	-	425,604	425,604	96,420,225	50,545,924	7.3%	6.8%	14.1%
2061	-	383,044	383,044	99,969,370	52,348,249	7.3%	6.8%	14.1%
2062	-	344,740	344,740	103,625,291	54,210,334	7.3%	6.8%	14.1%
2063	-	310,266	310,266	107,393,469	56,134,602	7.3%	6.8%	14.1%
2064	-	279,239	279,239	111,279,405	58,123,528	7.3%	6.8%	14.1%



Milwaukee County

Scenario 3c – Milwaukee New Hires Join WRS after 1/24, 6.8% Rate of Return for Milwaukee Plans with 10-Year Amortization of UAAL

	Milwaukee County - UAAL 10 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 96,078,265	\$ 11,573,529	\$ 11,573,529	\$ -	\$ 107,651,794	50.8%	5.5%	10.9%
2025	96,078,265	10,513,537	10,513,537	3,597,863	108,462,012	49.8%	5.6%	11.3%
2026	96,078,265	9,704,009	9,704,009	6,586,922	109,206,230	48.7%	5.7%	11.6%
2027	96,078,265	9,023,789	9,023,789	9,275,807	109,923,723	47.6%	5.8%	11.8%
2028	96,078,265	8,442,450	8,442,450	11,751,892	110,629,481	46.6%	5.9%	12.1%
2029	96,078,265	7,921,418	7,921,418	14,118,054	111,338,407	45.5%	6.0%	12.2%
2030	96,078,265	8,159,061	8,159,061	14,568,457	111,810,174	44.3%	6.0%	12.2%
2031	96,078,265	7,427,009	7,427,009	17,579,219	112,643,150	43.3%	6.1%	12.5%
2032	96,078,265	6,959,221	6,959,221	19,946,790	113,406,053	42.3%	6.2%	12.6%
2033	96,078,265	6,500,670	6,500,670	22,343,956	114,193,575	41.2%	6.2%	12.8%
2034	-	6,076,347	6,076,347	24,700,254	18,915,818	6.6%	6.3%	12.9%
2035	-	5,669,954	5,669,954	27,069,234	19,740,847	6.7%	6.3%	13.0%
2036	-	5,286,379	5,286,379	29,436,806	20,587,962	6.8%	6.4%	13.1%
2037	-	4,907,150	4,907,150	31,852,293	21,464,331	6.8%	6.4%	13.2%
2038	-	4,544,221	4,544,221	34,284,691	22,365,790	6.9%	6.5%	13.3%
2039	-	4,199,221	4,199,221	36,735,409	23,294,701	6.9%	6.5%	13.4%
2040	-	3,865,087	3,865,087	39,214,313	24,249,129	7.0%	6.5%	13.5%
2041	-	3,540,733	3,540,733	41,728,448	25,231,650	7.0%	6.6%	13.6%
2042	-	3,239,741	3,239,741	44,242,584	26,237,534	7.1%	6.6%	13.6%
2043	-	2,955,591	2,955,591	46,779,267	27,271,981	7.1%	6.6%	13.7%
2044	-	2,688,284	2,688,284	49,378,227	28,355,643	7.1%	6.6%	13.8%
2045	-	2,419,455	2,419,455	52,047,828	29,474,503	7.2%	6.7%	13.8%
2046	-	2,177,510	2,177,510	54,716,729	30,619,882	7.2%	6.7%	13.9%
2047	-	1,959,759	1,959,759	57,394,319	31,793,973	7.2%	6.7%	13.9%
2048	-	1,763,783	1,763,783	60,089,374	32,998,917	7.2%	6.7%	13.9%
2049	-	1,587,405	1,587,405	62,810,130	34,236,819	7.2%	6.7%	14.0%
2050	-	1,428,664	1,428,664	65,564,351	35,509,753	7.3%	6.7%	14.0%
2051	-	1,285,798	1,285,798	68,359,382	36,819,775	7.3%	6.7%	14.0%
2052	-	1,157,218	1,157,218	71,202,212	38,168,930	7.3%	6.7%	14.0%
2053	-	1,041,496	1,041,496	74,099,515	39,559,259	7.3%	6.8%	14.0%
2054	-	937,347	937,347	77,057,702	40,992,808	7.3%	6.8%	14.1%
2055	-	843,612	843,612	80,082,954	42,471,634	7.3%	6.8%	14.1%
2056	-	759,251	759,251	83,181,267	43,997,811	7.3%	6.8%	14.1%
2057	-	683,326	683,326	86,358,481	45,573,437	7.3%	6.8%	14.1%
2058	-	614,993	614,993	89,620,309	47,200,640	7.3%	6.8%	14.1%
2059	-	553,494	553,494	92,972,374	48,881,582	7.3%	6.8%	14.1%
2060	-	498,144	498,144	96,420,225	50,618,464	7.3%	6.8%	14.1%
2061	-	448,330	448,330	99,969,370	52,413,535	7.3%	6.8%	14.1%
2062	-	403,497	403,497	103,625,291	54,269,091	7.3%	6.8%	14.1%
2063	-	363,147	363,147	107,393,469	56,187,483	7.3%	6.8%	14.1%
2064	-	326,833	326,833	111,279,405	58,171,122	7.3%	6.8%	14.1%



Milwaukee County

Scenario 4c – Milwaukee New Hires Join WRS after 1/24, 5.8% Rate of Return for Milwaukee Plans with 10-Year Amortization of UAAL

	Milwaukee County - UAAL 10 years			WRS	Total	Total	Total	Total
	UAAL	Employer	Employee	ER+EE	Employer	Employer	Employee	Normal
	Payment	Normal Cost	Contribution	Cost	Cost	Cost	Cost	Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2024	\$ 131,086,840	\$ 14,476,370	\$ 14,476,370	\$ -	\$ 145,563,210	68.7%	6.8%	13.7%
2025	131,086,840	13,150,513	13,150,513	3,597,863	146,107,563	67.0%	6.8%	13.7%
2026	131,086,840	12,137,942	12,137,942	6,586,922	146,648,739	65.4%	6.8%	13.8%
2027	131,086,840	11,287,110	11,287,110	9,275,807	147,195,620	63.8%	6.8%	13.8%
2028	131,086,840	10,559,962	10,559,962	11,751,892	147,755,568	62.2%	6.8%	13.8%
2029	131,086,840	9,908,247	9,908,247	14,118,054	148,333,811	60.6%	6.8%	13.9%
2030	131,086,840	10,205,494	10,205,494	14,568,457	148,865,182	59.0%	6.8%	13.9%
2031	131,086,840	9,289,831	9,289,831	17,579,219	149,514,547	57.5%	6.8%	13.9%
2032	131,086,840	8,704,714	8,704,714	19,946,790	150,160,121	56.0%	6.8%	13.9%
2033	131,086,840	8,131,150	8,131,150	22,343,956	150,832,631	54.5%	6.8%	13.9%
2034	-	7,600,400	7,600,400	24,700,254	20,439,870	7.2%	6.8%	14.0%
2035	-	7,092,076	7,092,076	27,069,234	21,162,969	7.2%	6.8%	14.0%
2036	-	6,612,294	6,612,294	29,436,806	21,913,877	7.2%	6.8%	14.0%
2037	-	6,137,948	6,137,948	31,852,293	22,695,129	7.2%	6.8%	14.0%
2038	-	5,683,990	5,683,990	34,284,691	23,505,559	7.2%	6.8%	14.0%
2039	-	5,252,458	5,252,458	36,735,409	24,347,938	7.2%	6.8%	14.0%
2040	-	4,834,518	4,834,518	39,214,313	25,218,559	7.3%	6.8%	14.1%
2041	-	4,428,810	4,428,810	41,728,448	26,119,727	7.3%	6.8%	14.1%
2042	-	4,052,323	4,052,323	44,242,584	27,050,117	7.3%	6.8%	14.1%
2043	-	3,696,904	3,696,904	46,779,267	28,013,295	7.3%	6.8%	14.1%
2044	-	3,362,552	3,362,552	49,378,227	29,029,911	7.3%	6.8%	14.1%
2045	-	3,026,297	3,026,297	52,047,828	30,081,344	7.3%	6.8%	14.1%
2046	-	2,723,667	2,723,667	54,716,729	31,166,039	7.3%	6.8%	14.1%
2047	-	2,451,300	2,451,300	57,394,319	32,285,514	7.3%	6.8%	14.1%
2048	-	2,206,170	2,206,170	60,089,374	33,441,304	7.3%	6.8%	14.1%
2049	-	1,985,553	1,985,553	62,810,130	34,634,967	7.3%	6.8%	14.1%
2050	-	1,786,998	1,786,998	65,564,351	35,868,086	7.3%	6.8%	14.1%
2051	-	1,608,298	1,608,298	68,359,382	37,142,275	7.3%	6.8%	14.1%
2052	-	1,447,468	1,447,468	71,202,212	38,459,180	7.3%	6.8%	14.1%
2053	-	1,302,721	1,302,721	74,099,515	39,820,485	7.3%	6.8%	14.1%
2054	-	1,172,449	1,172,449	77,057,702	41,227,911	7.3%	6.8%	14.1%
2055	-	1,055,204	1,055,204	80,082,954	42,683,227	7.3%	6.8%	14.1%
2056	-	949,684	949,684	83,181,267	44,188,244	7.3%	6.8%	14.1%
2057	-	854,716	854,716	86,358,481	45,744,827	7.4%	6.8%	14.2%
2058	-	769,244	769,244	89,620,309	47,354,891	7.4%	6.8%	14.2%
2059	-	692,320	692,320	92,972,374	49,020,407	7.4%	6.8%	14.2%
2060	-	623,088	623,088	96,420,225	50,743,408	7.4%	6.8%	14.2%
2061	-	560,779	560,779	99,969,370	52,525,984	7.4%	6.8%	14.2%
2062	-	504,701	504,701	103,625,291	54,370,295	7.4%	6.8%	14.2%
2063	-	454,231	454,231	107,393,469	56,278,567	7.4%	6.8%	14.2%
2064	-	408,808	408,808	111,279,405	58,253,097	7.4%	6.8%	14.2%





March 31, 2023

Mr. Matt Stohr
Administrator -- Division of Retirement Services
Wisconsin D.E.T.F.
4822 Madison Yards Way
Madison, Wisconsin 53705

Dear Mr. Stohr:

Enclosed please find an electronic copy of the Analysis of Milwaukee Retirement Systems Closure and Entry in the WRS.

Sincerely,
Gabriel, Roeder, Smith & Company

A handwritten signature in black ink that reads "James D. Anderson". The signature is written in a cursive, flowing style.

James D. Anderson, FSA, EA, FCA, MAAA

JDA:rmn
Enclosures