

Wisconsin Retirement System

GASB Statement No. 68

Employer Reporting Accounting Schedules

December 31, 2020



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August 23, 2021

Employee Trust Funds Board
Wisconsin Department of Employee
Trust Funds
4822 Madison Yards Way
Madison, Wisconsin 53705

This report provides certain information requested by the Wisconsin Retirement System (“WRS”) in connection with the Governmental Accounting Standards Board (GASB) Statement No. 68 “Accounting and Financial Reporting for Pensions.”

The actuarial calculations in connection with this report were prepared for the purpose of complying with the requirements of GASB Statement No. 68. These calculations have been made on a basis that is consistent with our understanding of this Statement. Calculations for purposes of complying with the requirements of GASB Statement No. 67 will be provided in a separate report.

The total pension liability shown in this report is based on a roll-forward of the December 31, 2019 valuation liabilities to December 31, 2020. The calculation of the plan’s liability for this report is not applicable for funding purposes of the plan. A calculation of the plan’s liability for purposes other than satisfying the requirements of GASB Statement No. 68 may produce significantly different results. This report may be provided to parties other than the WRS only in its entirety and only with the permission of the WRS. GRS is not responsible for unauthorized use of this report.

The report was based upon information, furnished by the Department of Employee Trust Funds (DETF), concerning Retirement System benefits, financial transactions, and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of any data provided by DETF.

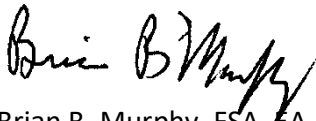
This report complements the actuarial valuation report that we provided to the Board and should be considered in conjunction with that report. Please see the actuarial valuation report as of December 31, 2019 for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions.

This system-wide report is intended to assist in preparation of the financial statements of WRS and its participating employers. Financial statements are the responsibility of the reporting entity and not the actuary. The statements are subject to an auditor’s review. Please let us know if the plan’s auditor recommends any changes. Employer level schedules are developed by GRS and provided to DETF separately from this report.

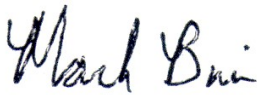
This report was prepared using our proprietary valuation model and related software which in our professional judgment has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

To the best of our knowledge, the information contained in this report is accurate, and fairly represents the actuarial position of WRS. All calculations have been made in conformity with generally accepted actuarial principles and practices as well as with the Actuarial Standards of Practice issued by the Actuarial Standards Board. Brian B. Murphy, Mark Buis and James D. Anderson are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the Academy of Actuaries to render the actuarial opinions contained herein. The signing actuaries are independent of the plan sponsor.

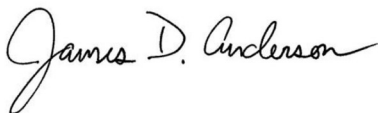
Respectfully submitted,



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



Mark Buis, FSA, EA, FCA, MAAA



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

BBM/MB/JDA:bd



SECTION A

EXECUTIVE SUMMARY

Executive Summary as of December 31, 2020

	2020
Actuarial Valuation Date	December 31, 2019
Measurement Date of the Net Pension Liability/(Asset)	December 31, 2020

Membership as of December 31, 2019

Number of	
- Retirees and Beneficiaries	216,944
- Inactive, Nonretired Members	169,471
- Active Members	259,234
- Total	645,649
Covered Payroll ⁽¹⁾	\$ 15,359,928,023

Net Pension Liability/(Asset)

Total Pension Liability	\$ 118,723,255,198
Plan Fiduciary Net Position	124,966,393,931
Net Pension Liability/(Asset)	\$ (6,243,138,733)
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	105.26%
Net Pension Liability/(Asset) as a Percentage of Covered Payroll	-40.65%

Development of the Single Discount Rate

Single Discount Rate	7.00%
Long-Term Expected Rate of Investment Return	7.00%
Long-Term Municipal Bond Rate ⁽²⁾	2.00%
Last year ending December 31 in the 2021 to 2120 projection period for which projected benefit payments are fully funded	2120

Total Pension Expense \$ (678,383,562)

Deferred Outflows and Deferred Inflows of Resources by Source to be Recognized in Future Pension Expenses

	Deferred Outflows of Resources	Deferred Inflows of Resources
Difference between expected and actual experience	\$ 9,035,738,622	\$ 1,946,281,838
Changes in assumptions	141,606,598	-
Net difference between projected and actual earnings on pension plan investments	-	11,720,984,146
Total	\$ 9,177,345,220	\$ 13,667,265,984

⁽¹⁾ Covered payroll is for 2020 and was provided by DETF.

⁽²⁾ Source: Fixed-income municipal bonds with 20 years to maturity that include only federally tax-exempt municipal bonds as reported in Fidelity Index's "20-year Municipal GO AA Index" as of December 31, 2020. In describing this index, Fidelity notes that the Municipal Curves are constructed using option-adjusted analytics of a diverse population of over 10,000 tax-exempt securities. The municipal bond rate is used as the discount rate in years where assets are not projected to be sufficient to meet benefit payments.

Discussion

Accounting Standard

For state and local government employers (as well as certain non-employers) that contribute to a Defined Benefit (DB) pension plan administered through a trust or equivalent arrangement, Governmental Accounting Standards Board (GASB) Statement No. 68 establishes standards for pension accounting and financial reporting. Under GASB Statement No. 68, the employer must account for and disclose the net pension liability/(asset), pension expense, and other information associated with providing retirement benefits to their employees (and former employees) on their basic financial statements.

The following discussion provides a summary of the information that is required to be disclosed under these accounting standards. A number of these disclosure items are provided in this report. However, certain information is not included in this report if it is not actuarial in nature, such as the notes to the financial statements regarding accounting policies and investments. As a result, the retirement system and/or plan sponsor is responsible for preparing and disclosing the non-actuarial information needed to comply with these accounting standards.

Financial Statements

GASB Statement No. 68 requires state and local government employers that contribute to DB pension plans to recognize the net pension liability/(asset) and the pension expense on their financial statements, along with the related deferred outflows of resources and deferred inflows of resources. The net pension liability/(asset) is the difference between the total pension liability and the plan's fiduciary net position. In traditional actuarial terms, this is analogous to the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement).

The pension expense recognized each fiscal year is equal to the change in the net pension liability/(asset) from the beginning of the year to the end of the year, adjusted for deferred recognition of the certain changes in the liability and investment experience.

It is our understanding that the WRS is a cost sharing multiple employer plan. The purpose of this report is to develop the required information in aggregate. Reporting for individual employers will be developed by GRS in accordance with each employer's proportionate share and reported to each employer by the DETF.

Notes to Financial Statements

GASB Statement No. 68 requires the notes of the employer's financial statements to disclose the total pension expense, the pension plan's liabilities and assets, and deferred outflows of resources and inflows of resources related to pensions.

In addition, GASB Statement No. 68 requires the notes of the financial statements for the employers to include certain additional information, including:

- A description of the types of benefits provided by the plan, as well as automatic or ad hoc COLAs;
- The number and classes of employees covered by the benefit terms;
- For the current year, sources of changes in the net pension liability/(asset);
- Significant assumptions and methods used to calculate the total pension liability;
- Inputs to the Single Discount Rate;
- Certain information about mortality assumptions and the dates of experience studies;
- The date of the valuation used to determine the total pension liability;
- Information about changes of assumptions or other inputs and benefit terms;
- The basis for determining contributions to the plan, including a description of the plan's funding policy, as well as member and employer contribution requirements;
- The total pension liability, fiduciary net position, net pension liability/(asset), and the pension plan's fiduciary net position as a percentage of the total pension liability;
- The net pension liability/(asset) using a discount rate that is 1% higher and 1% lower than used to calculate the total pension liability and net pension liability/(asset) for financial reporting purposes; and
- A description of the system that administers the pension plan.

Required Supplementary Information

The financial statements of employers also include required supplementary information showing the 10-year fiscal history of:

- Sources of changes in the net pension liability/(asset);
- Information about the components of the net pension liability/(asset) and related ratios, including the pension plan's fiduciary net position as a percentage of the total pension liability, and the net pension liability/(asset) as a percent of covered-employee payroll; and
- Comparison of actual employer contributions to the actuarially determined contributions based on the plan's funding policy.

These schedules may be built prospectively.

General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.00% on the actuarial value of assets), it is expected that:

1. The employer normal cost as a percentage of pay will decrease to the level of the future service normal cost as time passes.
2. The unfunded liability is expected to decrease in dollar amount until it is fully funded.
3. The funded status of the plan will remain very close to a 100% funded ratio.

This funding policy results in the expectation that the plan's assets will be able to fully pay for promised benefits through at least 2120. The projections in this report are strictly for the purpose of determining the GASB single discount rate and are different from a funding projection for the ongoing plan.

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the total pension liability and the market value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

- (1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, in other words, of transferring the obligations to an unrelated third party in an arm's length market value type transaction.
- (2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
- (3) The measurement would produce a different result if the actuarial value of assets were used instead of the market value of assets.

Limitation of Project Scope

Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.

Timing of the Valuation

An actuarial valuation to determine the total pension liability is required to be performed at least every two years. For the employer's financial reporting purposes, the net pension liability/(asset) and pension expense should be measured as of the employer's "measurement date" which may not be earlier than the employer's prior fiscal year-end date. If the actuarial valuation used to determine the total pension liability is not calculated as of the measurement date, the total pension liability is required to be rolled forward from the actuarial valuation date to the measurement date.

The total pension liability shown in this report is based on an actuarial valuation performed as of December 31, 2019 with roll-forward to December 31, 2020 and a measurement date of December 31, 2020. The roll-forward included adjustments in the liability due to changes in dividend adjustments, if any, for current and future retired members.

Single Discount Rate

Projected benefit payments are required to be discounted to their actuarial present values using a Single Discount Rate that reflects (1) a long-term expected rate of return on pension plan investments (to the extent that the plan's fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the plan's projected fiduciary net position is not sufficient to pay benefits).

For the purpose of this valuation, the expected rate of return on pension plan investments is 7.00%; the municipal bond rate is 2.00% (based on the daily rate closest to but not later than the measurement date of the Fidelity "20-Year Municipal GO AA Index"); and the resulting Single Discount Rate is 7.00%.

Actuarial Assumptions and Methods and Member Census Data

The actuarial assumptions used in this study are taken from the December 31, 2019 actuarial valuation report of the Wisconsin Retirement System. Therefore, the actuarial assumptions and methods employed for purposes of our Actuarial Study are the same actuarial assumptions and methods shown in the actuarial valuation report.

The member census data employed for purposes of our Actuarial Study was provided by DETF and is the same member census data used for the December 31, 2019 Actuarial Valuation Report of the Retirement System.

The Wisconsin Retirement System uses the Frozen Entry Age cost method for determining funding requirements. GASB Statement No. 68 requires the use of the Entry Age Normal cost method for accounting purposes. Therefore, we developed the Entry Age Normal Accrued Liability to reflect the Total Pension Liability for GASB purposes.

SECTION B

FINANCIAL STATEMENTS

Auditor's Note – This information is presented in draft form for review by the Plan's auditor. Please let us know if there are any items that the auditor changes so that we may maintain consistency with the Plan's financial statements.

Statement of Pension Expense Under GASB Statement No. 68

Fiscal Year Ended December 31, 2020

A. Expense

1. Service Cost	\$ 1,975,773,133
2. Interest on the Total Pension Liability	7,480,695,373
3. Current-Period Benefit Changes	0
4. Employee Contributions (made negative for addition here)	(1,053,242,596)
5. Projected Earnings on Plan Investments (made negative for addition here)	(7,712,620,845)
6. Pension Plan Administrative Expense	33,256,008
7. Other Changes in Plan Fiduciary Net Position	0
8. Recognition of Outflow (Inflow) of Resources due to Liabilities	2,454,642,686
9. Recognition of Outflow (Inflow) of Resources due to Assets	<u>(3,856,887,321)</u>
10. Total Pension Expense	\$ (678,383,562)



Statement of Outflows and Inflows Arising from Current Reporting Period Fiscal Year Ended December 31, 2020

A. Outflows (Inflows) of Resources due to Liabilities

1. Difference between expected and actual experience of the Total Pension Liability (gains) or losses ⁽¹⁾	\$ 6,376,708,179
2. Assumption Changes (gains) or losses	\$ -
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years}	4.6559
4. Outflow (Inflow) of Resources to be recognized in the current pension expense for the difference between expected and actual experience of the Total Pension Liability	\$ 1,369,597,324
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes	\$ -
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	\$ 1,369,597,324
7. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for the difference between expected and actual experience of the Total Pension Liability	\$ 5,007,110,855
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes	\$ -
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities	\$ 5,007,110,855

B. Outflows (Inflows) of Resources due to Assets

1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	\$ (8,985,935,923)
2. Recognition period for Assets {in years}	5.0000
3. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Assets	\$ (1,797,187,185)
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	\$ (7,188,748,738)

⁽¹⁾Starting with 2015, this item includes the impact of known Market Recognition Account deferred gains/losses on the liability for dividend payments. See page 23 for a full description.



Statement of Outflows and Inflows Arising from Current and Prior Reporting Periods Fiscal Year Ended December 31, 2020

A. Outflows and Inflows of Resources due to Liabilities and Assets to be Recognized in Current Pension Expense

	Outflows of Resources	Inflows of Resources	Net Outflows of Resources
1. Due to Liabilities	\$ 3,571,389,451	\$ 1,116,746,765	\$ 2,454,642,686
2. Due to Assets	-	3,856,887,321	(3,856,887,321)
3. Total	\$ 3,571,389,451	\$ 4,973,634,086	\$ (1,402,244,635)

B. Outflows and Inflows of Resources by Source to be Recognized in Current Pension Expense

	Outflows of Resources	Inflows of Resources	Net Outflows of Resources
1. Differences between expected and actual experience	\$ 3,461,725,238	\$ 1,116,746,765	\$ 2,344,978,473
2. Assumption Changes	109,664,213	-	109,664,213
3. Net Difference between projected and actual earnings on pension plan investments	-	3,856,887,321	(3,856,887,321)
4. Total	\$ 3,571,389,451	\$ 4,973,634,086	\$ (1,402,244,635)

C. Deferred Outflows and Deferred Inflows of Resources by Source to be Recognized in Future Pension Expenses

	Deferred Outflows of Resources	Deferred Inflows of Resources	Net Deferred Outflows of Resources
1. Differences between expected and actual experience	\$ 9,035,738,622	\$ 1,946,281,838	\$ 7,089,456,784
2. Assumption Changes	141,606,598	-	141,606,598
3. Net Difference between projected and actual earnings on pension plan investments	-	11,720,984,146	(11,720,984,146)
4. Total	\$ 9,177,345,220	\$ 13,667,265,984	\$ (4,489,920,764)

D. Deferred Outflows and Deferred Inflows of Resources by Year to be Recognized in Future Pension Expenses

Year Ending December 31	Net Deferred Outflows of Resources
2021	\$ (1,154,391,495)
2022	(313,480,997)
2023	(2,123,179,972)
2024	(898,868,300)
2025	-
Thereafter	-
Total	\$ (4,489,920,764)



Recognition of Deferred Outflows and Inflows of Resources

Actuarial Valuation Date - December 31, 2019

Measurement Date - December 31, 2020

Reporting Date - December 31, 2020

Year Established	Initial Amount	Initial Recognition Period	Current Year Recognition	Remaining Recognition	Remaining Recognition Period
Deferred Outflow (Inflow) due to Differences Between Expected and Actual Experience on Liabilities					
2015	\$ (4,247,328,263)	5.1322	\$ (109,406,648)	\$ -	0.0000
2016	150,347,332	5.0481	29,782,954	1,432,562	0.0481
2017	4,459,497,323	5.0080	890,474,705	897,598,503	1.0080
2018	(4,968,302,189)	4.9321	(1,007,340,117)	(1,946,281,838)	1.9321
2019	5,473,337,212	4.6706	1,171,870,255	3,129,596,702	2.6706
2020	6,376,708,179	4.6559	1,369,597,324	5,007,110,855	3.6559
Total			\$ 2,344,978,473	\$ 7,089,456,784	
Deferred Outflow (Inflow) due to Assumption Changes					
2015	\$ 1,412,040,786	5.1322	\$ 36,372,666	\$ -	0.0000
2016	-	5.0481	-	-	0.0481
2017	-	5.0080	-	-	1.0080
2018	361,481,239	4.9321	73,291,547	141,606,598	1.9321
2019	-	4.6706	-	-	2.6706
2020	-	4.6559	-	-	3.6559
Total			\$ 109,664,213	\$ 141,606,598	
Deferred Outflow (Inflow) due to Differences Between Projected and Actual Earnings on Plan Investments					
2016	\$ (1,015,847,753)	5.0000	\$ (203,169,549)	\$ -	0.0000
2017	(8,311,360,334)	5.0000	(1,662,272,067)	(1,662,272,066)	1.0000
2018	11,435,938,911	5.0000	2,287,187,782	4,574,375,565	2.0000
2019	(12,407,231,511)	5.0000	(2,481,446,302)	(7,444,338,907)	3.0000
2020	(8,985,935,923)	5.0000	(1,797,187,185)	(7,188,748,738)	4.0000
Total			\$ (3,856,887,321)	\$ (11,720,984,146)	

Recognition of Deferred Outflows and Inflows of Resources

According to Paragraph 33 of GASB Statement No. 68, *differences between expected and actual experience and changes in assumptions* are recognized in pension expense using a systematic and rational method over a closed period equal to the average of the expected remaining service lives of all employees that are provided with pensions through the pension plan (active employees and inactive employees) determined as of the beginning of the measurement period.

At the beginning of the current measurement period, the expected remaining service lives of all active employees in the plan was approximately 3,006,097 years. Additionally, the total plan membership (active employees and inactive employees) was 645,649. As a result, the average of the expected remaining service lives for purposes of recognizing the applicable deferred outflows and inflows of resources established in the current measurement period is 4.6559 years.

Additionally, *differences between projected and actual earnings on pension plan investments* should be recognized in pension expense using a systematic and rational method over a closed five-year period.

In accordance with the requirements of GASB Statement No. 68, the deferred outflows and inflows of resources are recognized in the pension expense as level dollar amounts over the various remaining closed periods shown above.



Schedule of Changes in Net Pension Liability/(Asset) and Related Ratios Current Period

Fiscal Year Ended December 31, 2020

A. Total pension liability	
1. Service Cost	\$ 1,975,773,133
2. Interest on the total pension liability	7,480,695,373
3. Changes of benefit terms	-
4. Difference between expected and actual experience of the total pension liability	6,376,708,179
5. Changes of assumptions	-
6. Benefit payments, including refunds of employee contributions	(5,978,223,363)
7. Net change in total pension liability	\$ 9,854,953,322
8. Total pension liability – beginning	108,868,301,876
9. Total pension liability – ending	<u><u>\$ 118,723,255,198</u></u>
B. Plan fiduciary net position	
1. Contributions – employer	\$ 1,133,315,516
2. Contributions – employee	1,053,242,596
3. Net investment income	16,698,556,768
4. Benefit payments, including refunds of employee contributions	(5,978,223,363)
5. Pension plan administrative expense	(33,256,008)
6. Other	-
7. Net change in plan fiduciary net position	\$ 12,873,635,509
8. Plan fiduciary net position – beginning	112,092,758,422
9. Plan fiduciary net position – ending	<u><u>\$ 124,966,393,931</u></u>
C. Net pension liability/(asset)	<u><u>\$ (6,243,138,733)</u></u>
D. Plan fiduciary net position as a percentage of the total pension liability	105.26%
E. Covered-employee payroll⁽¹⁾	\$ 15,359,928,023
F. Net pension liability/(asset) as a percentage of covered-employee payroll	-40.65%

⁽¹⁾Covered payroll provided by DETF.



Schedule of Changes in Net Pension Liability/(Asset) and Related Ratios Multiyear

Last 10 Fiscal Years (which may be built prospectively)

Fiscal year ending December 31,	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
Total Pension Liability										
Service Cost	\$ 1,975,773,133	\$ 1,902,507,977	\$ 1,860,937,125	\$ 1,842,879,321	\$ 1,814,134,799	\$ 1,787,870,316	\$ 1,757,020,910	\$ 1,745,048,505		
Interest on the Total Pension Liability	7,480,695,373	6,888,058,586	7,169,731,242	6,627,171,441	6,372,404,646	6,347,123,575	6,089,287,273	5,680,664,977		
Benefit Changes	-	-	-	-	-	-	-	-		
Experience ⁽¹⁾	6,376,708,179	5,473,337,212	(4,968,302,189)	4,459,497,323	150,347,332	(4,247,328,263)	437,265,852	2,659,920,220		
Assumption Changes	-	-	361,481,239	-	-	1,412,040,786	-	-		
Benefit Payments	(5,939,365,686)	(5,646,263,647)	(5,516,188,518)	(5,211,266,989)	(5,022,920,827)	(4,823,586,513)	(4,540,247,874)	(4,224,700,261)		
Refunds	(38,857,677)	(44,106,052)	(40,234,768)	(38,358,098)	(39,275,602)	(37,642,404)	(34,401,181)	(33,271,143)		
Net Change in Total Pension Liability	9,854,953,322	8,573,534,076	(1,132,575,869)	7,679,922,998	3,274,690,348	438,477,497	3,708,924,980	5,827,662,298		
Total Pension Liability - Beginning⁽²⁾	108,868,301,876	100,294,767,800	101,427,343,669	93,747,420,671	90,129,650,901	89,691,173,404	85,982,248,424	80,154,586,126		
Total Pension Liability - Ending (a)	\$ 118,723,255,198	\$ 108,868,301,876	\$ 100,294,767,800	\$ 101,427,343,669	\$ 93,404,341,249	\$ 90,129,650,901	\$ 89,691,173,404	\$ 85,982,248,424		
Plan Fiduciary Net Position										
Employer Contributions ⁽³⁾	\$ 1,133,315,516	\$ 1,046,942,283	\$ 1,030,507,544	\$ 1,017,558,990	\$ 963,121,911	\$ 977,733,921	\$ 987,792,834	\$ 914,698,118		
Employee Contributions	1,053,242,596	987,662,027	972,950,131	965,452,633	921,863,806	937,225,184	941,903,267	871,259,789		
Pension Plan Net Investment Income	16,698,556,768	19,049,541,932	(4,049,354,577)	14,875,414,636	7,273,069,087	(673,122,812)	4,891,014,826	11,347,296,075		
Benefit Payments	(5,939,365,686)	(5,646,263,647)	(5,516,188,518)	(5,211,266,989)	(5,022,920,827)	(4,823,586,513)	(4,540,247,874)	(4,224,700,261)		
Refunds	(38,857,677)	(44,106,052)	(40,234,768)	(38,358,098)	(39,275,602)	(37,642,404)	(34,401,181)	(33,271,143)		
Pension Plan Administrative Expense	(33,256,008)	(34,197,722)	(31,612,198)	(26,132,873)	(20,426,189)	(22,708,614)	(24,036,951)	(22,857,502)		
Other	-	(3,901,654)	(25,448,686)	-	-	-	-	-		
Net Change in Plan Fiduciary Net Position	12,873,635,509	15,355,677,167	(7,659,381,072)	11,582,668,299	4,075,432,186	(3,642,101,238)	2,222,024,921	8,852,425,076		
Plan Fiduciary Net Position - Beginning⁽⁴⁾	112,092,758,422	96,737,081,255	104,396,462,327	92,813,794,028	88,504,670,309	92,146,771,547	89,924,746,626	81,072,321,550		
Plan Fiduciary Net Position - Ending (b)	\$ 124,966,393,931	\$ 112,092,758,422	\$ 96,737,081,255	\$ 104,396,462,327	\$ 92,580,102,495	\$ 88,504,670,309	\$ 92,146,771,547	\$ 89,924,746,626		
Net Pension Liability/(Asset) - Ending (a) - (b)	(6,243,138,733)	(3,224,456,546)	3,557,686,545	(2,969,118,658)	824,238,754	1,624,980,592	(2,455,598,143)	(3,942,498,202)		
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	105.26 %	102.96 %	96.45 %	102.93 %	99.12 %	98.20 %	102.74 %	104.59 %		
Covered-Employee Payroll⁽⁵⁾	\$ 15,359,928,023	\$ 14,832,491,878	\$ 14,301,446,269	\$ 13,943,116,649	\$ 13,706,000,000	\$ 13,530,500,000	\$ 13,219,500,000	\$ 12,884,800,000		
Net Pension Liability/(Asset) as a Percentage of Covered-Employee Payroll	(40.65)%	(21.74)%	24.88 %	(21.29)%	6.01 %	12.01 %	(18.58)%	(30.60)%		

Notes to Schedule:

⁽¹⁾Starting with 2015, this item includes the impact of known Market Recognition Account deferred gains/losses on the liability for dividend payments. See page 23 for a full description.

⁽²⁾In 2017, beginning of year liabilities were adjusted by \$343,079,422 to reflect the Long Term Disability Insurance (LTDI) program -- this amount was provided in Milliman Inc.'s December 31, 2016 actuarial valuation of the Long Term Disability Insurance Plan dated April 21, 2017.

⁽³⁾Employer contributions shown in the above table includes Employer Required Contributions in addition to contributions paid by specific employers for unique circumstances such as Prior Service Contributions, Early Retirement Contributions, and Employer Additional Contributions.

⁽⁴⁾As of calendar year 2017, the LTDI program is reported within the Wisconsin Retirement System (WRS). Accordingly, there is an adjustment to the calendar year 2017 beginning net position of \$233,691,533 to reflect LTDI assets.

⁽⁵⁾Covered payroll provided by DETF.



Schedule of Contributions Multiyear

Last 10 Fiscal Years

FY Ending December 31,	Actuarially Determined Contribution^{(1),(2)}	Actual Contribution	Contribution Deficiency (Excess)	Covered Payroll⁽³⁾	Actual Contribution as a % of Covered Payroll
2011					
2012					
2013	\$ 905,148,514	\$ 905,148,514	\$ -	\$ 12,884,800,000	7.02%
2014	977,068,988	977,068,988	-	13,219,500,000	7.39%
2015	967,730,052	967,730,052	-	13,530,500,000	7.15%
2016	954,159,009	954,159,009	-	13,706,000,000	6.96%
2017	1,014,870,679	1,014,870,679	-	13,943,116,649	7.28%
2018	1,028,390,526	1,028,390,526	-	14,301,446,269	7.19%
2019	1,044,964,610	1,044,964,610	-	14,832,491,878	7.05%
2020	1,131,486,002	1,131,486,002	-	15,359,928,023	7.37%

⁽¹⁾ Since it is the actuary's understanding that the System's practice is to require employers to contribute the percent-of-payroll employer contribution rate shown in the actuarial valuation report, the Actuarially Determined Contributions shown in the Schedule of Contributions are the actual contributions made by the participating employers in the fiscal year.

⁽²⁾ Starting with 2016, Actuarially Determined Contributions includes Employer Required Contributions, paid by each employer based on a percentage of payroll. This amount excludes contributions paid by specific employers for unique circumstances such as Prior Service Contributions, Early Retirement Contributions, and Employer Additional Contributions.

⁽³⁾ Covered payroll provided by DETF.

Notes to Schedule of Contributions

Summary of Actuarial Methods and Assumptions Used in the Calculation of the 2020 Contribution Rate

Valuation Date: December 31, 2018

Methods and Assumptions Used to Determine Actuarial Contribution on prior page:

Actuarial Cost Method	Frozen Entry Age
Amortization Method	Level Percent of Payroll - Closed Amortization Period
Amortization Period	30-Year closed from date of participation in WRS
Asset Valuation Method	5-Year smoothed value
Inflation	2.0% to 2.5% -- approximate; No explicit price inflation assumption is used in this valuation.
Salary Increases	3.1% to 8.6% including inflation
Net Investment Rate of Return	5.40%
Weighted based on assumed rate for:	
Retired participants	5.00%
Active participants	
Post-retirement participants	5.00%
Pre-retirement participants	7.00%
Retirement Age	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2018 valuation pursuant to an experience study of the period 2015 - 2017.
Mortality	Wisconsin 2018 mortality table adjusted for future mortality improvements using the MP-2018 fully generational improvement scale (multiplied by 60%)

Other Information:

Notes The actuarially determined contribution for calendar year 2020 was determined from the December 31, 2018 actuarial valuation.

Single Discount Rate

A single discount rate of 7.00% was used to measure the total pension liability, which was based on the expected rate of return on pension plan investments. Because of the unique structure of WRS, the 7.00% expected rate of return implies that a dividend of approximately 1.90% will always be paid after reflecting known changes in the Market Recognition Account. For purposes of the single discount rate, it was assumed that the dividend would always be paid. The projection of cash flows used to determine this single discount rate assumed that plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate. Based on these assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments (including expected dividends) of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Regarding the sensitivity of the net pension liability/(asset) to changes in the single discount rate, the following presents the plan's net pension liability/(asset), calculated using a single discount rate of 7.00%, as well as what the plan's net pension liability/(asset) would be if it were calculated using a single discount rate that is 100 basis points lower or 100 basis points higher:

Sensitivity of Net Pension Liability/(Asset) to the Single Discount Rate Assumption

	Current Single Discount		
	1% Decrease	Rate Assumption	1% Increase
Discount Rate	6.00%	7.00%	8.00%
Ultimate Dividend Rate	1.90%	1.90%	1.90%
Total Pension Liability	\$ 130,908,996,769	\$ 118,723,255,198	\$ 109,772,918,906
Plan Fiduciary Net Position	124,966,393,931	124,966,393,931	124,966,393,931
Net Pension Liability/(Asset)	\$ 5,942,602,838	\$ (6,243,138,733)	\$ (15,193,475,025)

This schedule above is presented because it is required by GASB standards. Users of this report should not conclude that the authors view the upper end of the range as reasonable. For the WRS, the determination of liabilities also depends on the assumed dividend which is linked to the interest rate used in the liability calculation. Therefore, we have also shown an alternative set of Sensitivity Analysis which varies the assumed dividend in conjunction with the change in the discount rate. For the liabilities shown below, the assumed dividend was 1.0% for the 6.0% discount rate, 1.9% for the 7.0% discount rate, and 2.9% for the 8.0% discount rate.

Sensitivity of Net Pension Liability/(Asset) to the Single Discount Rate Assumption

	Current Single Discount		
	1% Decrease	Rate Assumption	1% Increase
Discount Rate	6.00%	7.00%	8.00%
Ultimate Dividend Rate	1.00%	1.90%	2.90%
Total Pension Liability	\$ 123,591,365,490	\$ 118,723,255,198	\$ 115,084,942,555
Plan Fiduciary Net Position	124,966,393,931	124,966,393,931	124,966,393,931
Net Pension Liability/(Asset)	\$ (1,375,028,441)	\$ (6,243,138,733)	\$ (9,881,451,376)

SECTION C

CALCULATION OF THE SINGLE DISCOUNT RATE

Auditor's Note – This information is presented in draft form for review by the Plan's auditor. Please let us know if there are any items that the auditor changes so that we may maintain consistency with the Plan's financial statements.

Calculation of the Single Discount Rate

GASB Statement No. 67 includes a specific requirement for the discount rate that is used for the purpose of the measurement of the Total Pension Liability. This rate considers the ability of the fund to meet benefit obligations in the future. To make this determination, employer contributions, employee contributions, benefit payments, expenses and investment returns are projected into the future. The Plan Net Position (assets) in future years can then be determined and compared to its obligation to make benefit payments in those years. As long as assets are projected to be on hand in a future year, the assumed valuation discount rate is used. In years where assets are not projected to be sufficient to meet benefit payments, the use of a municipal bond rate is required, as described in the following paragraph.

The Single Discount Rate (SDR) is equivalent to applying these two rates to the benefits that are projected to be paid during the different time periods. The SDR reflects (1) the long-term expected rate of return on pension plan investments (during the period in which the fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating (which is published by the Bond Buyer Index) as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is 7.00%; the municipal bond rate is 2.00%; and the resulting SDR is 7.00%.

We deemed administrative expenses to be immaterial for the purpose of developing the single discount rate and consequently did not include them in the calculation.

The tables in this section provide background for the development of the SDR.

The **Projection of Contributions** table shows the development of expected contributions in future years. Normal Cost contributions for future hires are not included (nor are their liabilities). The contribution rate for the first year was developed from the 2019 actuarial valuation (14.20%). Expected contribution rates gradually decrease as the unrecognized asset losses from the Market Recognition Account are phased in over the next 5 years. The expected contribution rate then remains level for 20 years and is assumed to migrate to the ultimate contribution rate of 13.39% once the Experience Amortization Reserve (EAR) component is paid down.

The **Projection of Plan Fiduciary Net Position** table shows the development of expected asset levels in future years.

The **Present Values of Projected Benefit Payments** table shows the development of the Single Discount Rate (SDR). It breaks down the benefit payments into present values for funded and unfunded portions and shows the equivalent total at the SDR.

The WRS funding policy as it affects the closed group cannot be modelled with 100% accuracy. In reality, assets that appear to be left over after all benefit obligations are satisfied would be assigned to the funding benefits of people who enter the plan after the measurement date.

Single Discount Rate Development

Projection of Contributions Ending December 31, 2120

Year	Payroll for Current Employees	Contributions from Current Employees	Normal Cost Contributions	UAL Contributions	Total Contributions
0	\$ 14,526,937,850				
1	14,040,187,859	\$ 953,809,498	\$ 1,054,210,498	\$ -	\$ 2,008,019,996
2	13,609,236,238	872,446,754	964,283,254	-	1,836,730,008
3	13,197,565,448	795,544,998	879,286,576	-	1,674,831,574
4	12,795,442,717	740,697,821	818,666,013	-	1,559,363,834
5	12,399,021,787	664,363,594	734,296,603	-	1,398,660,197
6	12,007,666,290	626,160,241	692,071,845	-	1,318,232,085
7	11,620,769,224	605,984,833	669,772,710	-	1,275,757,543
8	11,236,831,697	585,963,756	647,644,151	-	1,233,607,907
9	10,854,431,684	566,022,855	625,604,208	-	1,191,627,063
10	10,471,302,075	546,043,908	603,522,214	-	1,149,566,121
11	10,083,494,469	525,821,019	581,170,600	-	1,106,991,618
12	9,687,783,535	505,185,997	558,363,470	-	1,063,549,467
13	9,285,195,653	484,192,365	535,159,983	-	1,019,352,348
14	8,876,897,503	462,900,962	511,627,379	-	974,528,341
15	8,460,680,786	441,196,631	487,638,382	-	928,835,013
16	8,037,160,542	419,111,446	463,228,440	-	882,339,885
17	7,607,302,938	396,695,787	438,453,239	-	835,149,026
18	7,171,918,966	373,991,948	413,359,521	-	787,351,469
19	6,732,883,974	351,097,719	388,055,374	-	739,153,093
20	6,292,379,299	328,126,852	362,666,520	-	690,793,372
21	5,850,939,324	305,107,211	337,223,759	-	642,330,970
22	5,406,608,915	281,936,844	311,614,407	-	593,551,251
23	4,957,065,164	258,494,618	285,704,578	-	544,199,197
24	4,502,132,392	234,771,373	259,484,149	-	494,255,522
25	4,045,959,068	210,983,437	233,192,219	-	444,175,656
26	3,593,267,878	230,181,572	254,411,211	-	484,592,784
27	3,147,682,397	201,637,759	222,862,786	-	424,500,545
28	2,713,876,077	173,848,509	192,148,352	-	365,996,861
29	2,298,070,333	147,212,360	162,708,397	-	309,920,757
30	1,911,961,902	122,478,594	135,371,077	-	257,849,671
31	1,565,283,723	100,270,695	110,825,505	-	211,096,200
32	1,260,252,396	80,730,657	89,228,621	-	169,959,279
33	999,338,256	64,016,727	70,755,330	-	134,772,058
34	782,619,126	50,133,891	55,411,143	-	105,545,034
35	606,524,740	38,853,440	42,943,276	-	81,796,716
36	464,905,352	29,781,427	32,916,314	-	62,697,741
37	351,791,245	22,535,437	24,907,588	-	47,443,026
38	263,019,774	16,848,815	18,622,374	-	35,471,189
39	194,588,350	12,465,158	13,777,280	-	26,242,438
40	142,526,183	9,130,102	10,091,165	-	19,221,267
41	103,411,641	6,624,459	7,321,770	-	13,946,229
42	74,353,445	4,763,016	5,264,386	-	10,027,402
43	53,070,512	3,399,650	3,757,508	-	7,157,159
44	37,872,368	2,426,070	2,681,446	-	5,107,517
45	26,846,290	1,719,750	1,900,776	-	3,620,525
46	18,727,696	1,199,680	1,325,962	-	2,525,642
47	12,864,287	824,075	910,820	-	1,734,894
48	8,504,338	544,780	602,126	-	1,146,906
49	5,294,911	339,188	374,891	-	714,079
50	3,043,500	194,964	215,487	-	410,451



Single Discount Rate Development

Projection of Contributions Ending December 31, 2120 (Concluded)

Year	Payroll for Current Employees	Contributions from Current Employees	Normal Cost Contributions	UAL Contributions	Total Contributions
51	\$ 1,559,407	\$ 99,894	\$ 110,410	-	\$ 210,304
52	694,701	44,502	49,187	-	93,689
53	299,629	19,194	21,214	-	40,408
54	130,954	8,389	9,272	-	17,661
55	46,818	2,999	3,315	-	6,314
56	10,401	666	737	-	1,403
57	508	33	36	-	68
58	120	8	8	-	16
59	-	-	-	-	-
60	-	-	-	-	-
61	-	-	-	-	-
62	-	-	-	-	-
63	-	-	-	-	-
64	-	-	-	-	-
65	-	-	-	-	-
66	-	-	-	-	-
67	-	-	-	-	-
68	-	-	-	-	-
69	-	-	-	-	-
70	-	-	-	-	-
71	-	-	-	-	-
72	-	-	-	-	-
73	-	-	-	-	-
74	-	-	-	-	-
75	-	-	-	-	-
76	-	-	-	-	-
77	-	-	-	-	-
78	-	-	-	-	-
79	-	-	-	-	-
80	-	-	-	-	-
81	-	-	-	-	-
82	-	-	-	-	-
83	-	-	-	-	-
84	-	-	-	-	-
85	-	-	-	-	-
86	-	-	-	-	-
87	-	-	-	-	-
88	-	-	-	-	-
89	-	-	-	-	-
90	-	-	-	-	-
91	-	-	-	-	-
92	-	-	-	-	-
93	-	-	-	-	-
94	-	-	-	-	-
95	-	-	-	-	-
96	-	-	-	-	-
97	-	-	-	-	-
98	-	-	-	-	-
99	-	-	-	-	-
100	-	-	-	-	-



Single Discount Rate Development Projection of Plan Fiduciary Net Position Ending December 31, 2120

Year	Projected Beginning Plan Net Position	Projected Total Contributions	Projected Benefit Payments Including Dividends	Projected Investment Earnings at 7.00%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)=(a)+(b)-(c)+(d)
1	\$ 124,966,393,931	\$ 2,008,019,996	\$ 6,407,246,125	\$ 8,596,278,812	\$ 129,163,446,615
2	129,163,446,615	1,836,730,008	6,787,025,470	8,871,111,283	133,084,262,435
3	133,084,262,435	1,674,831,574	7,103,820,125	9,129,097,497	136,784,371,382
4	136,784,371,382	1,559,363,834	7,532,123,135	9,369,395,036	140,181,007,117
5	140,181,007,117	1,398,660,197	7,883,549,136	9,589,538,159	143,285,656,337
6	143,285,656,337	1,318,232,085	8,149,497,770	9,794,945,458	146,249,336,110
7	146,249,336,110	1,275,757,543	8,410,416,789	9,991,963,864	149,106,640,728
8	149,106,640,728	1,233,607,907	8,677,917,325	10,181,320,730	151,843,652,040
9	151,843,652,040	1,191,627,063	8,943,514,207	10,362,328,374	154,454,093,271
10	154,454,093,271	1,149,566,121	9,213,867,191	10,534,309,709	156,924,101,911
11	156,924,101,911	1,106,991,618	9,479,499,056	10,696,605,535	159,248,200,009
12	159,248,200,009	1,063,549,467	9,737,674,529	10,848,914,330	161,422,989,277
13	161,422,989,277	1,019,352,348	9,985,706,864	10,991,094,535	163,447,729,296
14	163,447,729,296	974,528,341	10,222,864,785	11,123,123,890	165,322,516,742
15	165,322,516,742	928,835,013	10,459,426,507	11,244,647,167	167,036,572,416
16	167,036,572,416	882,339,885	10,691,242,709	11,355,054,916	168,582,724,508
17	168,582,724,508	835,149,026	10,906,775,918	11,454,245,742	169,965,343,358
18	169,965,343,358	787,351,469	11,105,722,854	11,542,539,066	171,189,511,038
19	171,189,511,038	739,153,093	11,293,857,644	11,620,099,042	172,254,905,529
20	172,254,905,529	690,793,372	11,470,798,151	11,686,924,516	173,161,825,267
21	173,161,825,267	642,330,970	11,632,998,168	11,743,160,416	173,914,318,485
22	173,914,318,485	593,551,251	11,785,995,778	11,788,892,178	174,510,766,136
23	174,510,766,136	544,199,197	11,929,924,015	11,823,993,117	174,949,034,434
24	174,949,034,434	494,255,522	12,065,725,919	11,848,280,756	175,225,844,794
25	175,225,844,794	444,175,656	12,194,063,855	11,861,518,474	175,337,475,070
26	175,337,475,070	484,592,784	12,313,160,401	11,866,625,388	175,375,532,841
27	175,375,532,841	424,500,545	12,421,151,451	11,863,506,015	175,242,387,950
28	175,242,387,950	365,996,861	12,513,339,535	11,849,000,864	174,944,046,140
29	174,944,046,140	309,920,757	12,589,085,326	11,823,581,204	174,488,462,774
30	174,488,462,774	257,849,671	12,646,327,147	11,787,929,125	173,887,914,424
31	173,887,914,424	211,096,200	12,675,296,924	11,743,285,252	173,166,998,952
32	173,166,998,952	169,959,279	12,673,249,345	11,691,476,181	172,355,185,067
33	172,355,185,067	134,772,058	12,639,428,634	11,634,602,190	171,485,130,680
34	171,485,130,680	105,545,034	12,570,742,331	11,575,056,100	170,594,989,483
35	170,594,989,483	81,796,716	12,468,395,040	11,515,450,653	169,723,841,811
36	169,723,841,811	62,697,741	12,334,702,558	11,458,413,254	168,910,250,248
37	168,910,250,248	47,443,026	12,170,532,227	11,406,585,739	168,193,746,786
38	168,193,746,786	35,471,189	11,978,090,067	11,362,640,128	167,613,768,036
39	167,613,768,036	26,242,438	11,758,199,497	11,329,290,076	167,211,101,053
40	167,211,101,053	19,221,267	11,510,471,620	11,309,385,634	167,029,236,334
41	167,029,236,334	13,946,229	11,234,081,582	11,305,983,641	167,115,084,622
42	167,115,084,622	10,027,402	10,929,500,393	11,322,338,224	167,517,949,855
43	167,517,949,855	7,157,159	10,600,184,768	11,361,771,137	168,286,693,384
44	168,286,693,384	5,107,517	10,252,437,085	11,427,477,978	169,466,841,793
45	169,466,841,793	3,620,525	9,891,413,432	11,522,459,319	171,101,508,206
46	171,101,508,206	2,525,642	9,519,064,937	11,649,660,078	173,234,628,990
47	173,234,628,990	1,734,894	9,136,747,187	11,812,106,131	175,911,722,828
48	175,911,722,828	1,146,906	8,746,324,948	12,012,916,133	179,179,460,919
49	179,179,460,919	714,079	8,349,135,949	12,255,309,403	183,086,348,452
50	183,086,348,452	410,451	7,946,002,768	12,542,652,107	187,683,408,242



Single Discount Rate Development Projection of Plan Fiduciary Net Position Ending December 31, 2120 (Concluded)

Year	Projected Beginning Plan Net Position	Projected Total Contributions	Projected Benefit Payments Including Dividends	Projected Investment Earnings at 7.00%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)=(a)+(b)-(c)+(d)
51	\$ 187,683,408,242	\$ 210,304	\$ 7,537,832,537	\$ 12,878,483,745	\$ 193,024,269,754
52	193,024,269,754	93,689	7,125,606,238	13,266,523,939	199,165,281,144
53	199,165,281,144	40,408	6,710,527,678	13,710,674,944	206,165,468,817
54	206,165,468,817	17,661	6,294,200,057	14,215,012,317	214,086,298,738
55	214,086,298,738	6,314	5,878,300,834	14,783,780,299	222,991,784,517
56	222,991,784,517	1,403	5,464,567,912	15,421,399,875	232,948,617,883
57	232,948,617,883	68	5,054,891,399	16,132,474,332	244,026,200,884
58	244,026,200,884	16	4,651,259,660	16,921,793,319	256,296,734,559
59	256,296,734,559	-	4,255,728,758	17,794,340,120	269,835,345,921
60	269,835,345,921	-	3,870,377,042	18,755,302,114	284,720,270,992
61	284,720,270,992	-	3,497,243,866	19,810,085,651	301,033,112,777
62	301,033,112,777	-	3,138,318,843	20,964,334,484	318,859,128,417
63	318,859,128,417	-	2,795,520,805	22,223,950,588	338,287,558,201
64	338,287,558,201	-	2,470,612,686	23,595,120,126	359,412,065,642
65	359,412,065,642	-	2,165,129,502	25,084,346,725	382,331,282,865
66	382,331,282,865	-	1,880,339,802	26,698,490,987	407,149,434,051
67	407,149,434,051	-	1,617,228,682	28,444,814,709	433,977,020,078
68	433,977,020,078	-	1,376,520,762	30,331,028,019	462,931,527,335
69	462,931,527,335	-	1,158,696,536	32,365,338,433	494,138,169,232
70	494,138,169,232	-	963,962,415	34,556,503,786	527,730,710,602
71	527,730,710,602	-	792,216,262	36,913,891,131	563,852,385,472
72	563,852,385,472	-	643,006,777	39,447,542,378	602,656,921,073
73	602,656,921,073	-	515,467,907	42,168,248,233	644,309,701,399
74	644,309,701,399	-	408,273,434	45,087,631,208	688,989,059,173
75	688,989,059,173	-	319,659,061	48,218,235,299	736,887,635,411
76	736,887,635,411	-	247,529,064	51,573,617,488	788,213,723,835
77	788,213,723,835	-	189,634,666	55,168,435,711	843,192,524,880
78	843,192,524,880	-	143,756,929	59,018,530,347	902,067,298,297
79	902,067,298,297	-	107,830,625	63,141,000,640	965,100,468,312
80	965,100,468,312	-	80,012,680	67,554,279,702	1,032,574,735,334
81	1,032,574,735,334	-	58,711,344	72,278,211,331	1,104,794,235,321
82	1,104,794,235,321	-	42,580,891	77,334,131,347	1,182,085,785,777
83	1,182,085,785,777	-	30,504,588	82,744,955,401	1,264,800,236,591
84	1,264,800,236,591	-	21,567,623	88,535,274,462	1,353,313,943,430
85	1,353,313,943,430	-	15,032,615	94,731,458,797	1,448,030,369,611
86	1,448,030,369,611	-	10,317,677	101,361,770,862	1,549,381,822,796
87	1,549,381,822,796	-	6,965,508	108,456,487,926	1,657,831,345,215
88	1,657,831,345,215	-	4,620,543	116,048,035,181	1,773,874,759,853
89	1,773,874,759,853	-	3,009,584	124,171,129,636	1,898,042,879,905
90	1,898,042,879,905	-	1,922,214	132,862,935,454	2,030,903,893,144
91	2,030,903,893,144	-	1,201,020	142,163,231,195	2,173,065,923,320
92	2,173,065,923,320	-	731,748	152,114,589,454	2,325,179,781,026
93	2,325,179,781,026	-	431,531	162,762,569,824	2,487,941,919,319
94	2,487,941,919,319	-	242,681	174,155,926,002	2,662,097,602,641
95	2,662,097,602,641	-	127,237	186,346,827,807	2,848,444,303,211
96	2,848,444,303,211	-	60,690	199,391,099,137	3,047,835,341,657
97	3,047,835,341,657	-	26,270	213,348,473,012	3,261,183,788,400
98	3,261,183,788,400	-	10,887	228,282,864,813	3,489,466,642,326
99	3,489,466,642,326	-	6,127	244,262,664,752	3,733,729,300,951
100	3,733,729,300,951	-	-	261,361,051,067	3,995,090,352,017

The Plan Fiduciary Net Position is projected to grow throughout the projection period due to the surplus as of the measurement date combined with the funding policy. Please note this is a theoretical closed group projection which does not take into account the projected payout of future new entrants into the System.



Single Discount Rate Development

Present Values of Projected Benefits Ending December 31, 2120

Year	Projected Beginning Plan Net Position	Projected Benefit Payments Including Dividends	Funded Portion of Benefit Payments	Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments using Expected Return Rate (v)	Present Value of Unfunded Benefit Payments using Municipal Bond Rate (vf)	Present Value of Benefit Payments using Single Discount Rate (sdr)
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v ^{(a)-.5}	(g)=(e)*vf ^{(a)-.5}	(h)=(c)/(1+sdr) ^{(a)-.5}
1	\$ 124,966,393,931	\$ 6,407,246,125	\$ 6,407,246,125	\$ -	\$ 6,194,118,623	\$ -	\$ 6,194,118,623
2	129,163,446,615	6,787,025,470	6,787,025,470	-	6,132,023,527	-	6,132,023,527
3	133,084,262,435	7,103,820,125	7,103,820,125	-	5,998,359,792	-	5,998,359,792
4	136,784,371,382	7,532,123,135	7,532,123,135	-	5,943,936,886	-	5,943,936,886
5	140,181,007,117	7,883,549,136	7,883,549,136	-	5,814,264,428	-	5,814,264,428
6	143,285,656,337	8,149,497,770	8,149,497,770	-	5,617,202,339	-	5,617,202,339
7	146,249,336,110	8,410,416,789	8,410,416,789	-	5,417,799,932	-	5,417,799,932
8	149,106,640,728	8,677,917,325	8,677,917,325	-	5,224,409,080	-	5,224,409,080
9	151,843,652,040	8,943,514,207	8,943,514,207	-	5,032,063,245	-	5,032,063,245
10	154,454,093,271	9,213,867,191	9,213,867,191	-	4,845,025,420	-	4,845,025,420
11	156,924,101,911	9,479,499,056	9,479,499,056	-	4,658,603,214	-	4,658,603,214
12	159,248,200,009	9,737,674,529	9,737,674,529	-	4,472,412,074	-	4,472,412,074
13	161,422,989,277	9,985,706,864	9,985,706,864	-	4,286,290,403	-	4,286,290,403
14	163,447,729,296	10,222,864,785	10,222,864,785	-	4,101,017,455	-	4,101,017,455
15	165,322,516,742	10,459,426,507	10,459,426,507	-	3,921,417,623	-	3,921,417,623
16	167,036,572,416	10,691,242,709	10,691,242,709	-	3,746,102,314	-	3,746,102,314
17	168,582,724,508	10,906,775,918	10,906,775,918	-	3,571,610,234	-	3,571,610,234
18	169,965,343,358	11,105,722,854	11,105,722,854	-	3,398,840,009	-	3,398,840,009
19	171,189,511,038	11,293,857,644	11,293,857,644	-	3,230,296,762	-	3,230,296,762
20	172,254,905,529	11,470,798,151	11,470,798,151	-	3,066,267,026	-	3,066,267,026
21	173,161,825,267	11,632,998,168	11,632,998,168	-	2,906,191,426	-	2,906,191,426
22	173,914,318,485	11,785,995,778	11,785,995,778	-	2,751,788,561	-	2,751,788,561
23	174,510,766,136	11,929,924,015	11,929,924,015	-	2,603,170,893	-	2,603,170,893
24	174,949,034,434	12,065,725,919	12,065,725,919	-	2,460,564,082	-	2,460,564,082
25	175,225,844,794	12,194,063,855	12,194,063,855	-	2,324,052,378	-	2,324,052,378
26	175,337,475,070	12,313,160,401	12,313,160,401	-	2,193,225,093	-	2,193,225,093
27	175,375,532,841	12,421,151,451	12,421,151,451	-	2,067,720,095	-	2,067,720,095
28	175,242,387,950	12,513,339,535	12,513,339,535	-	1,946,791,057	-	1,946,791,057
29	174,944,046,140	12,589,085,326	12,589,085,326	-	1,830,444,280	-	1,830,444,280
30	174,488,462,774	12,646,327,147	12,646,327,147	-	1,718,474,019	-	1,718,474,019
31	173,887,914,424	12,675,296,924	12,675,296,924	-	1,609,729,571	-	1,609,729,571
32	173,166,998,952	12,673,249,345	12,673,249,345	-	1,504,177,135	-	1,504,177,135
33	172,355,185,067	12,639,428,634	12,639,428,634	-	1,402,021,480	-	1,402,021,480
34	171,485,130,680	12,570,742,331	12,570,742,331	-	1,303,179,898	-	1,303,179,898
35	170,594,989,483	12,468,395,040	12,468,395,040	-	1,208,009,149	-	1,208,009,149
36	169,723,841,811	12,334,702,558	12,334,702,558	-	1,116,875,009	-	1,116,875,009
37	168,910,250,248	12,170,532,227	12,170,532,227	-	1,029,915,716	-	1,029,915,716
38	168,193,746,786	11,978,090,067	11,978,090,067	-	947,318,266	-	947,318,266
39	167,613,768,036	11,758,199,497	11,758,199,497	-	869,091,262	-	869,091,262
40	167,211,101,053	11,510,471,620	11,510,471,620	-	795,122,238	-	795,122,238
41	167,029,236,334	11,234,081,582	11,234,081,582	-	725,261,422	-	725,261,422
42	167,115,084,622	10,929,500,393	10,929,500,393	-	659,437,342	-	659,437,342
43	167,517,949,855	10,600,184,768	10,600,184,768	-	597,727,014	-	597,727,014
44	168,286,693,384	10,252,437,085	10,252,437,085	-	540,297,283	-	540,297,283
45	169,466,841,793	9,891,413,432	9,891,413,432	-	487,169,676	-	487,169,676
46	171,101,508,206	9,519,064,937	9,519,064,937	-	438,159,674	-	438,159,674
47	173,234,628,990	9,136,747,187	9,136,747,187	-	393,048,321	-	393,048,321
48	175,911,722,828	8,746,324,948	8,746,324,948	-	351,638,297	-	351,638,297
49	179,179,460,919	8,349,135,949	8,349,135,949	-	313,709,966	-	313,709,966
50	183,086,348,452	7,946,002,768	7,946,002,768	-	279,030,525	-	279,030,525



Single Discount Rate Development

Present Values of Projected Benefits Ending December 31, 2120 (Concluded)

Year	Projected Beginning Plan Net Position	Projected Benefit Payments Including Dividends	Funded Portion of Benefit Payments	Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments using Expected Return Rate (v)	Present Value of Unfunded Benefit Payments using Municipal Bond Rate (vf)	Present Value of Benefit Payments using Single Discount Rate (sdr)
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v [^] ((a)-.5)	(g)=(e)*vf [^] ((a)-.5)	(h)=(c)/(1+sdr) [^] ((a)-.5)
51	\$ 187,683,408,242	\$ 7,537,832,537	\$ 7,537,832,537	\$ -	\$ 247,380,642	\$ -	\$ 247,380,642
52	193,024,269,754	7,125,606,238	7,125,606,238	-	218,553,250	-	218,553,250
53	199,165,281,144	6,710,527,678	6,710,527,678	-	192,357,154	-	192,357,154
54	206,165,468,817	6,294,200,057	6,294,200,057	-	168,619,748	-	168,619,748
55	214,086,298,738	5,878,300,834	5,878,300,834	-	147,175,637	-	147,175,637
56	222,991,784,517	5,464,567,912	5,464,567,912	-	127,866,320	-	127,866,320
57	232,948,617,883	5,054,891,399	5,054,891,399	-	110,542,273	-	110,542,273
58	244,026,200,884	4,651,259,660	4,651,259,660	-	95,061,217	-	95,061,217
59	256,296,734,559	4,255,728,758	4,255,728,758	-	81,287,346	-	81,287,346
60	269,835,345,921	3,870,377,042	3,870,377,042	-	69,090,527	-	69,090,527
61	284,720,270,992	3,497,243,866	3,497,243,866	-	58,345,500	-	58,345,500
62	301,033,112,777	3,138,318,843	3,138,318,843	-	48,932,199	-	48,932,199
63	318,859,128,417	2,795,520,805	2,795,520,805	-	40,735,835	-	40,735,835
64	338,287,558,201	2,470,612,686	2,470,612,686	-	33,646,104	-	33,646,104
65	359,412,065,642	2,165,129,502	2,165,129,502	-	27,556,891	-	27,556,891
66	382,331,282,865	1,880,339,802	1,880,339,802	-	22,366,545	-	22,366,545
67	407,149,434,051	1,617,228,682	1,617,228,682	-	17,978,366	-	17,978,366
68	433,977,020,078	1,376,520,762	1,376,520,762	-	14,301,374	-	14,301,374
69	462,931,527,335	1,158,696,536	1,158,696,536	-	11,250,736	-	11,250,736
70	494,138,169,232	963,962,415	963,962,415	-	8,747,573	-	8,747,573
71	527,730,710,602	792,216,262	792,216,262	-	6,718,734	-	6,718,734
72	563,852,385,472	643,006,777	643,006,777	-	5,096,540	-	5,096,540
73	602,656,921,073	515,467,907	515,467,907	-	3,818,368	-	3,818,368
74	644,309,701,399	408,273,434	408,273,434	-	2,826,464	-	2,826,464
75	688,989,059,173	319,659,061	319,659,061	-	2,068,215	-	2,068,215
76	736,887,635,411	247,529,064	247,529,064	-	1,496,756	-	1,496,756
77	788,213,723,835	189,634,666	189,634,666	-	1,071,664	-	1,071,664
78	843,192,524,880	143,756,929	143,756,929	-	759,252	-	759,252
79	902,067,298,297	107,830,625	107,830,625	-	532,250	-	532,250
80	965,100,468,312	80,012,680	80,012,680	-	369,104	-	369,104
81	1,032,574,735,334	58,711,344	58,711,344	-	253,121	-	253,121
82	1,104,794,235,321	42,580,891	42,580,891	-	171,568	-	171,568
83	1,182,085,785,777	30,504,588	30,504,588	-	114,869	-	114,869
84	1,264,800,236,591	21,567,623	21,567,623	-	75,903	-	75,903
85	1,353,313,943,430	15,032,615	15,032,615	-	49,443	-	49,443
86	1,448,030,369,611	10,317,677	10,317,677	-	31,715	-	31,715
87	1,549,381,822,796	6,965,508	6,965,508	-	20,010	-	20,010
88	1,657,831,345,215	4,620,543	4,620,543	-	12,405	-	12,405
89	1,773,874,759,853	3,009,584	3,009,584	-	7,552	-	7,552
90	1,898,042,879,905	1,922,214	1,922,214	-	4,508	-	4,508
91	2,030,903,893,144	1,201,020	1,201,020	-	2,632	-	2,632
92	2,173,065,923,320	731,748	731,748	-	1,499	-	1,499
93	2,325,179,781,026	431,531	431,531	-	826	-	826
94	2,487,941,919,319	242,681	242,681	-	434	-	434
95	2,662,097,602,641	127,237	127,237	-	213	-	213
96	2,848,444,303,211	60,690	60,690	-	95	-	95
97	3,047,835,341,657	26,270	26,270	-	38	-	38
98	3,261,183,788,400	10,887	10,887	-	15	-	15
99	3,733,729,307,078	6,127	6,127	-	8	-	8
100	3,733,729,300,951	-	-	-	-	-	-
Totals					\$ 135,812,700,951	\$ -	\$ 135,812,700,951



SECTION D

SUMMARY OF ASSUMPTIONS

Summary of Assumptions Used to Develop Total Pension Liability Assumptions Adopted by DETF Board After Consulting with Actuary

The actuarial assumptions were developed based on an Experience Study covering January 1, 2015 through December 31, 2017. While sample rates are illustrated in this section, please refer to the Wisconsin Experience Study report dated November 19, 2018 which supplies a full listing of actuarial assumptions at every age and a rationale for the selection of assumptions. Please note that minor technical adjustments were made to the mortality rates subsequent to publication of the 2015-2017 Experience Study. Please refer to page 25 for the most current mortality assumptions.

Economic Assumptions

In determining plan liabilities for accounting purposes, a discount rate of 7.0% is used for both actives and retirees. However, a long-term assumed dividend of 1.9% is also assumed. For retirees, this produces the same result as assuming a 5% discount rate. Dividends are not guaranteed, and this valuation develops dividends that reflect known entries (phased-in gains and losses) in the Market Recognition Account (MRA), based on the 7.0% return assumption. The dividend rates used in developing the Total Pension Liability for accounting purposes is as follows:

2020: 1.7% Core, 21.0% Variable
2021: 5.1% Core, 13.0% Variable
2022: 4.8% Core, 1.9% Variable
2023: 3.4% Core, 1.9% Variable
2024: 5.0% Core, 1.9% Variable
2025: 3.2% Core, 1.9% Variable
2026 and later: 1.9% Core, 1.9% Variable

The **Wage Inflation Rate** assumed in this valuation was 3.00% per year. The wage inflation rate is defined to be the portion of total pay increases for an individual that are due to macro-economic forces including productivity, price inflation, and labor market conditions. The wage inflation rate does not include pay changes rated to individual merit and seniority effects.

No specific **Price Inflation** assumption is required to perform this valuation. The price inflation assumption used to evaluate the investment return assumption is 2.5%.

The assumed **Real Rate of Return** over wage inflation is defined to be the portion of total investment return that is more than the assumed total wage growth rate. Considering other economic assumptions, the 7.0% pre-retirement investment return rate translates to an assumed real rate of return over wage inflation of 4.0%. The assumed real rate of return over price inflation would be 4.5%, considering an inflation assumption of 2.5%.



Merit and Longevity pay increase assumptions for individual active members are shown for sample services below. An additional 3.0% recognizes wage inflation, including price inflation, productivity increases, and other macroeconomic forces.

% Merit and Longevity Increase Next Year						
Service	Gen.	Exec. & Elec.	University Teachers	Public School Teachers	Protective	
					With S.S.	W/O S.S.
1	3.5%	2.5%	3.0%	5.6%	4.8%	5.5%
2	3.5%	2.5%	3.0%	5.6%	4.8%	5.5%
3	3.1%	2.0%	2.9%	5.2%	4.1%	4.7%
4	2.8%	1.6%	2.8%	4.7%	3.5%	3.8%
5	2.5%	1.1%	2.7%	4.3%	2.8%	3.0%
10	1.5%	0.2%	2.2%	2.6%	1.1%	0.9%
15	1.1%	0.2%	1.7%	1.4%	0.8%	0.5%
20	0.9%	0.2%	1.2%	0.6%	0.7%	0.4%
25	0.6%	0.2%	0.9%	0.3%	0.6%	0.3%
30	0.4%	0.2%	0.7%	0.2%	0.5%	0.2%

Decrement Probabilities

The mortality table used was the Wisconsin 2018 Mortality Table adopted by the Board in connection with the 2015-2017 Experience Study. The rates in this table were based on actual WRS experience adjusted for future mortality improvements using the MP-2018 fully generational improvement scale. In accordance with the experience study's in-depth review of Wisconsin-specific mortality experience, the MP-2018 fully generational improvement scale was multiplied by a 60% factor. This approach will be reviewed in the next experience study covering the period 2018-2020. Sample retirement values from this table are shown below. This assumption is used to measure the probabilities of participants dying before retirement and the probabilities of each benefit payment being made after retirement.

Single Life Retirement Values Wisconsin 2018 Mortality Table with 5% Interest

Sample Attained Ages in 2019	Present Value of \$1 Monthly for Life*		Future Life Expectancy (years)*		Mortality Rates*	
	Males	Females	Males	Females	Males	Females
40	\$212.96	\$217.63	45.3	48.2	0.000990	0.000614
45	204.65	210.28	40.3	43.1	0.001238	0.000921
50	194.18	201.13	35.3	38.1	0.001615	0.001339
55	181.54	189.97	30.4	33.2	0.003763	0.002413
60	167.29	176.71	25.8	28.4	0.005438	0.003515
65	150.31	160.75	21.3	23.7	0.008324	0.005262
70	131.09	141.76	17.1	19.2	0.013497	0.008737
75	109.61	120.10	13.2	15.0	0.022662	0.015813
80	86.87	96.74	9.7	11.1	0.041599	0.029763
85	65.44	73.54	6.8	7.9	0.077801	0.059843

* With a fully generational mortality table, the mortality rate depends on the year of birth. Later years of birth will typically correspond to a lower mortality rate at a given age.

The values shown above are for non-disabled participants. For disabled participants, the following table was used:

Sample Attained Ages in 2019	Present Value of \$1 Monthly for Life		Future Life Expectancy (years)		Mortality Rates*	
	Males	Females	Males	Females	Males	Females
40	\$199.56	\$207.83	37.7	41.8	0.001426	0.001019
45	187.92	198.13	32.8	36.7	0.002348	0.001534
50	174.47	186.35	28.0	31.8	0.004657	0.002707
55	158.72	172.25	23.4	27.0	0.006292	0.003981
60	140.24	155.41	19.1	22.4	0.010955	0.006133
65	119.88	135.75	15.0	18.0	0.017782	0.010516
70	97.88	113.76	11.3	13.9	0.030679	0.019
75	75.72	90.28	8.2	10.2	0.058153	0.035883
80	56.09	67.67	5.7	7.1	0.107102	0.073379
85	40.07	49.49	3.9	4.9	0.172842	0.126673

* With a fully generational mortality table, the mortality rate depends on the year of birth. Later years of birth will typically correspond to a lower mortality rate at a given age.

Active Participant Mortality Rates

Sample Attained Ages in 2019	Mortality Rates*	
	Males	Females
20	0.000135	0.000081
25	0.000165	0.000090
30	0.000213	0.000123
35	0.000376	0.000222
40	0.000495	0.000307
45	0.000619	0.000461
50	0.000807	0.000670
55	0.001881	0.001208
60	0.002719	0.001759
65	0.004162	0.002634
70	0.006748	0.004373
75	0.011331	0.007914
80	0.020799	0.014897

** With a fully generational mortality table, the mortality rate depends on the year of birth. Later years of birth will typically correspond to a lower mortality rate at a given age.*

This assumption is used to measure the probability of participants dying while in service.

Rates of Retirement for Those Eligible to Retire

Normal Retirement

Age	General		Exec. & Elected	University		Public School		Protective*	
	Male	Female		Male	Female	Male	Female	With S.S.	W/O S.S.
50								6%	2%
51								8%	4%
52								10%	4%
53								25%	17%
54								20%	23%
55								20%	25%
56								20%	25%
57	19%	17%	8%	12%	15%	33%	27%	20%	25%
58	19%	17%	8%	12%	15%	29%	27%	20%	33%
59	19%	17%	8%	12%	10%	24%	27%	20%	33%
60	19%	17%	20%	12%	12%	25%	27%	20%	20%
61	19%	17%	12%	12%	16%	25%	27%	20%	20%
62	26%	27%	12%	12%	15%	35%	37%	30%	40%
63	29%	27%	12%	12%	20%	32%	30%	30%	40%
64	28%	27%	15%	12%	20%	29%	28%	30%	40%
65	30%	30%	15%	15%	20%	29%	37%	40%	40%
66	35%	35%	15%	20%	24%	35%	39%	40%	100%
67	30%	30%	15%	20%	20%	33%	33%	40%	100%
68	19%	25%	15%	18%	17%	27%	30%	40%	100%
69	19%	25%	20%	16%	17%	23%	28%	40%	100%
70	19%	25%	20%	20%	18%	25%	38%	100%	100%
71	19%	20%	20%	18%	18%	20%	20%	100%	100%
72	19%	20%	20%	16%	18%	15%	20%	100%	100%
73	19%	20%	20%	16%	15%	15%	20%	100%	100%
74	19%	20%	20%	16%	15%	15%	20%	100%	100%
75	100%	100%	100%	100%	100%	100%	100%	100%	100%

* Includes reduced retirements for Protective with 20+ years of service.

Reduced Retirement

Age	% Retiring Next Year						
	General		Exec. & Elected	University		Public School	
	Male	Female		Male	Female	Male	Female
55	8.0%	7.0%	3.0%	3.0%	5.0%	13.0%	12.0%
56	8.0%	7.0%	3.0%	3.0%	5.0%	13.0%	12.0%
57	4.8%	5.5%	3.0%	3.0%	5.0%	12.0%	12.0%
58	5.7%	6.5%	3.0%	3.0%	5.0%	13.0%	12.0%
59	6.8%	7.0%	3.0%	4.0%	5.0%	14.0%	13.0%
60	8.5%	9.5%	5.0%	5.5%	9.0%	14.0%	17.0%
61	9.0%	9.5%	5.0%	5.5%	9.0%	15.0%	17.0%
62	17.0%	16.0%	2.0%	7.4%	12.0%	21.0%	23.0%
63	18.0%	18.0%	2.0%	7.4%	12.0%	21.0%	23.0%
64	17.0%	18.0%	2.0%	10.0%	15.0%	21.0%	23.0%

The assumed rates of separation from employment prior to service retirement due to disability and other causes are shown below for sample ages. For other terminations it was assumed that a percentage depending on age of participants terminating after age 35 with 5 or more years of service will leave their contributions on deposit and be paid a benefit at normal retirement age and that the remaining participants would take a separation benefit. The percentage taking a separation benefit is 25% at age 35, grading downward to 0% at retirement eligibility. All participants terminating prior to normal retirement age with less than 5 years of service were assumed to take a separation benefit.

Assumed Termination Rates by Attained Age and Years of Service

Age	Service	% of Active Participants Terminating								
		General		Exec. & Elected	University		Public Schools		Protective	
		Males	Females		Males	Females	Males	Females	With Soc. Sec.	Without Soc. Sec.
	0	17.0%	20.0%	14.0%	16.0%	14.5%	18.5%	15.0%	16.0%	4.0%
	1	12.3%	15.0%	13.0%	15.0%	14.0%	11.0%	11.0%	9.5%	3.5%
	2	9.3%	11.5%	12.0%	13.0%	13.0%	8.0%	8.0%	6.0%	1.5%
	3	7.6%	10.0%	10.0%	11.0%	10.0%	6.5%	6.0%	5.0%	1.3%
	4	7.5%	9.5%	10.0%	9.0%	9.5%	5.5%	5.5%	4.5%	1.2%
	5	5.8%	7.8%	5.0%	8.0%	9.0%	4.0%	5.0%	4.0%	1.1%
	6	4.8%	7.0%	5.0%	7.5%	7.0%	3.5%	4.0%	3.8%	1.0%
	7	4.7%	6.0%	5.0%	6.0%	6.0%	3.2%	3.7%	3.5%	0.9%
	8	4.1%	5.7%	5.0%	5.5%	5.0%	3.0%	3.3%	3.0%	0.8%
	9	4.0%	5.3%	5.0%	5.0%	4.0%	2.8%	3.0%	2.5%	0.7%
25	10 & Over	4.0%	5.0%	5.0%	5.0%	4.0%	2.5%	2.5%	2.5%	0.7%
30		3.7%	4.7%	5.0%	4.7%	4.0%	2.2%	2.4%	2.3%	0.7%
35		3.0%	3.9%	5.0%	4.2%	4.0%	1.8%	1.9%	2.0%	0.7%
40		2.4%	3.2%	5.0%	3.4%	3.7%	1.5%	1.5%	1.6%	0.6%
45		2.0%	2.7%	4.7%	2.7%	3.2%	1.4%	1.3%	1.4%	0.6%
50		1.7%	2.2%	4.2%	2.2%	2.7%	1.3%	1.2%	1.2%	0.5%
55		1.6%	2.0%	4.0%	2.0%	2.5%	1.3%	1.2%	1.2%	0.5%
60		1.6%	2.0%	4.0%	2.0%	2.5%	1.3%	1.2%	1.2%	0.5%

Disability Rates

Age	% of Active Participants Becoming Disabled									
	General		Exec. & Elected		University		Public Schools		Protective	
	Males	Females	Males	Females	Males	Females	Males	Females	With SS	W/O SS
20	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.03%
25	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.03%
30	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.03%
35	0.01%	0.02%	0.01%	0.01%	0.00%	0.02%	0.00%	0.01%	0.01%	0.03%
40	0.02%	0.03%	0.01%	0.01%	0.00%	0.02%	0.01%	0.01%	0.02%	0.04%
45	0.04%	0.04%	0.01%	0.01%	0.01%	0.02%	0.02%	0.04%	0.02%	0.08%
50	0.09%	0.06%	0.02%	0.02%	0.01%	0.04%	0.06%	0.07%	0.04%	0.46%
55	0.17%	0.12%	0.09%	0.09%	0.04%	0.06%	0.12%	0.10%	0.61%	0.34%
60	0.30%	0.16%	0.11%	0.11%	0.06%	0.09%	0.19%	0.15%	1.02%	0.10%

SECTION E

PLAN PROVISIONS

Summary of Benefit Provisions

Normal Retirement Eligibility

The age a participant becomes eligible for an unreduced age and service annuity is:

General, Public School, and University		Protective		Executive & Elected [#]	
Age	Service	Age	Service	Age	Service
65	Any*	54	Any*	62	Any*
57	30	53	25	57	30

* Participants first employed after 1989 and terminated before April 24, 1998 must have creditable service in 5 calendar years.

These conditions apply to those people hired on or before December 31, 2016. For others, the General eligibility conditions apply.

Normal Retirement Annuity

The age and service annuity payable at Normal Retirement Age is based on Final Average Earnings (FAE) and Creditable Service (CS) as follows:

Multiplier for Service Rendered			Group
Before 2000	Between 2000 and 2011	After 2011	
2.165%	2.0%	1.6%	Executive group and elected officials
2.165%	2.0%	2.0%	Protective occupation participants covered by Social Security
2.665%	2.5%	2.5%	Protective occupation participants not covered by Social Security
1.765%	1.6%	1.6%	All other participants

FAE is generally the average of the 3 highest years of earnings (July 1 - June 30 for teachers, educational support staff, and judges; calendar year for others) preceding retirement. These years do not have to be consecutive. For legislators and state constitutional officers who are ineligible to receive pay increases during their term, FAE is the statutory rate of earnings at termination.

Maximum formula annuity is 85% of FAE for protective occupation participants not covered by Social Security, 65% of FAE for protectives covered by Social Security, and 70% for all other participants. If greater than the formula amount, an annuity equal to the actuarial equivalent of two times the required accumulated contributions is paid in lieu of the formula amount (i.e., the Money Purchase Minimum).



Reduced Retirement. Any participant who has attained age 55 and any Protective occupation participant who has attained age 50 may apply for a reduced retirement annuity. The benefit is reduced 0.4% for each month that the annuity effective date precedes the Normal Retirement Age. For Non-Protective participants terminating after 6/30/90, the 0.4% is reduced for months after the attainment of age 57 and before the annuity effective date by .001111% for each month of creditable service.

Voluntary Termination Before Immediate Benefit Eligibility. Participant may either (i) receive a refund of accumulated contributions, or (ii) leave contributions on deposit and apply for a retirement annuity on or after the minimum retirement age based upon age and accrued service at time of termination.

Post-Retirement Adjustments. Annuities are increased annually if the investment income credited to retired life funds is in excess of the assumed benefit rate (presently 5%), other plan experiences are within projected ranges, and the resulting adjustment would be at least 0.5% (2.0% for the variable fund).

Disability Benefits. Generally, disability means the inability to engage in any substantial gainful activity by reason of a medically determinable physical or mental impairment which can be expected to result in death or to be of long-continued and indefinite duration. Disability applicants must be participating employees who are under normal retirement age, have not already taken a WRS benefit and who meet a service requirement.

For this purpose **normal retirement age** is:

- 65 for general employees and executives and elected officials hired after December 31, 2016
- 62 for executives and elected officials hired on or before December 31, 2016
- 53 for protective occupation employees with 25 or more years of creditable service
- 54 for other protective occupation employees

The **service requirement** is that during the seven years preceding application the individual must have earned:

- At least 6 months of service credit in five of those years or
- A total of five years of service credit.

Protective occupation employees who become disabled between the ages of 50 and 55, who have at least 15 years of service, and who can no longer perform the duties of their position may apply for a special disability benefit until age 55.

Disability Amount: The disability benefit is the WRS formula benefit based upon service projected to normal retirement age as described above, without regard to the reduced retirement reduction.

Death-in-Service.

- (a) Prior to age 50 for Protective participants, age 55 for others, the benefit is the equivalent of twice the accumulated employee contributions required and all additional contributions and employer amounts contributed prior to 1974 for teachers, or 1966 for others.
- (b) After age 50 for Protective participants, age 55 for others, the benefit is the amount that would have been paid if participant had retired and elected 100% survivor option. Benefit is payable to any natural living person.

Interest Credits. For years after 1999, and for people with some active service after 1999, participant core accounts (including the variable at core accounts) are credited with interest at the full (core) effective rate. For others, accounts are credited with interest as follows:

Date of Participation	Rate Credited for Purpose of	
	Money Purchase Minimum	Refunds
Prior to 1982	Actual	Actual
January 1, 1982 & Later	5%	3%

Participant variable accounts are credited with interest based on the earnings in the variable portfolio.

Contribution Rates. The financial objective of WRS is to establish and receive contributions that will remain level from year to year and decade to decade.

Statutory required participant contributions prior to July 1, 2011 were as follows:

General, Public School, and University	5.0%
Executives & Elected Officials	5.5
Protectives	
- With Social Security	6.0
- Without Social Security	8.0

Statutory required participant contributions after July 1, 2011 are set equal to one-half of the actuarially determined rate for General participants and Executive and Elected Officials. Participant contributions for Protective participants are set equal to the participant contribution for General members.

Normal Form of Benefit. The normal form of benefit is a straight life annuity with no death benefits. Optional forms of benefit which are actuarially reduced are listed below:

- A life annuity with 60 or 180 monthly payments guaranteed.
- A joint survivorship annuity with 75% continued to beneficiary.
- A joint survivorship annuity with 100% continued to beneficiary.
- A joint survivorship annuity reduced 25% upon either your death or your beneficiary's death.
- A joint survivorship annuity with 100% continued to beneficiary combined with 180 monthly payments guaranteed.

For formula benefit calculations, optional forms are calculated at the lower of the current age or age 62 (Normal Retirement Age for Protective occupations). If a retiree (and beneficiary if in receipt of a joint survivorship annuity) dies prior to receiving benefits which, in total, are at least equal to the members contributions, a "residual refund" for the difference is paid.

Vesting. Participants hired prior to July 1, 2011 vest immediately. After July 1, 2011, participants vest after 5 years of service.



SECTION F

GLOSSARY OF TERMS

Auditor's Note – This information is presented in draft form for review by the Plan's auditor. Please let us know if there are any items that the auditor changes so that we may maintain consistency with the Plan's financial statements.

Glossary of Terms

<i>Actuarial Accrued Liability (AAL)</i>	The AAL is the difference between the actuarial present value of all benefits and the actuarial value of future normal costs. The definition comes from the fundamental equation of funding which states that the present value of all benefits is the sum of the AAL and the present value of future normal costs. The AAL may also be referred to as "accrued liability" or "actuarial liability."
<i>Actuarial Assumptions</i>	These assumptions are estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and compensation increases. Actuarial assumptions are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (compensation increases, payroll growth, inflation and investment return) consist of an underlying real rate of return plus an assumption for a long-term average rate of inflation.
<i>Accrued Service</i>	Service credited under the system which was rendered before the date of the actuarial valuation.
<i>Actuarial Equivalent</i>	A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate actuarial assumptions.
<i>Actuarial Cost Method</i>	A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of the pension trust benefits between future normal cost and actuarial accrued liability. The actuarial cost method may also be referred to as the actuarial funding method.
<i>Actuarial Gain (Loss)</i>	The difference in liabilities between actual experience and expected experience during the period between two actuarial valuations is the gain (loss) on the accrued liabilities.
<i>Actuarial Present Value (APV)</i>	The amount of funds currently required to provide a payment or series of payments in the future. The present value is determined by discounting future payments at predetermined rates of interest and probabilities of payment.
<i>Actuarial Valuation</i>	The actuarial valuation report determines, as of the actuarial valuation date, the service cost, total pension liability, and related actuarial present value of projected benefit payments for pensions.
<i>Actuarial Valuation Date</i>	The date as of which an actuarial valuation is performed.
<i>Actuarially Determined Contribution (ADC) or Annual Required Contribution (ARC)</i>	A calculated contribution into a defined benefit pension plan for the reporting period, most often determined based on the funding policy of the plan. Typically the Actuarially Determined Contribution has a normal cost payment and an amortization payment.

Glossary of Terms

<i>Amortization Payment</i>	The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.
<i>Amortization Method</i>	The method used to determine the periodic amortization payment may be a level dollar amount, or a level percent of pay amount. The period will typically be expressed in years, and the method will either be “open” (meaning, reset each year) or “closed” (the number of years remaining will decline each year).
<i>Cost-of-Living Adjustments</i>	Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.
<i>Cost-Sharing Multiple-Employer Defined Benefit Pension Plan (cost-sharing pension plan)</i>	A multiple-employer defined benefit pension plan in which the pension obligations to the employees of more than one employer are pooled and pension plan assets can be used to pay the benefits of the employees of any employer that provides pensions through the pension plan.
<i>Covered-Employee Payroll</i>	The payroll of covered employees, which is typically only the pensionable pay and does not include pay above any pay cap.
<i>Deferred Retirement Option Program (DROP)</i>	A program that permits a plan member to elect a calculation of benefit payments based on service credits and salary, as applicable, as of the DROP entry date. The plan member continues to provide service to the employer and is paid for the service by the employer after the DROP entry date; however, the pensions that would have been paid to the plan member are credited to an individual member account within the defined benefit pension plan until the end of the DROP period. Other variations for DROP exist and will be more fully detailed in the plan provision section of the valuation report.
<i>Deferred Inflows and Outflows</i>	The deferred inflows and outflows of pension resources are amounts used under GASB Statement No. 68 in developing the annual pension expense. Deferred inflows and outflows arise with differences between expected and actual experiences; changes of assumptions. The portion of these amounts not included in pension expense should be included in the deferred inflows or outflows of resources.
<i>Discount Rate</i>	For GASB purposes, the discount rate is the single rate of return that results in the present value of all projected benefit payments to be equal to the sum of the funded and unfunded projected benefit payments, specifically: <ol style="list-style-type: none">1. The benefit payments to be made while the pension plans’ fiduciary net position is projected to be greater than the benefit payments that are projected to be made in the period; and2. The present value of the benefit payments not in (1) above, discounted using the municipal bond rate.

Glossary of Terms

<i>Entry Age Actuarial Cost Method (EAN)</i>	The EAN is a funding method for allocating the costs of the plan between the normal cost and the accrued liability. The actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis (either level dollar or level percent of pay) over the earnings or service of the individual between entry age and assumed exit age(s). The portion of the actuarial present value allocated to a valuation year is the normal cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is the actuarial accrued liability. The sum of the accrued liability plus the present value of all future normal costs is the present value of all benefits.
<i>GASB</i>	The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities.
<i>Fiduciary Net Position</i>	The fiduciary net position is the market value of the assets of the trust dedicated to the defined benefit provisions.
<i>Long-Term Expected Rate of Return</i>	The long-term rate of return is the expected return to be earned over the entire trust portfolio based on the asset allocation of the portfolio.
<i>Money-Weighted Rate of Return</i>	The money-weighted rate of return is a method of calculating the returns that adjusts for the changing amounts actually invested. For purposes of GASB Statement No. 67, money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.
<i>Multiple-Employer Defined Benefit Pension Plan</i>	A multiple-employer plan is a defined benefit pension plan that is used to provide pensions to the employees of more than one employer.
<i>Municipal Bond Rate</i>	The Municipal Bond Rate is the discount rate to be used for those benefit payments that occur after the assets of the trust have been depleted.
<i>Net Pension Liability/(Asset) (NPL)</i>	The NPL is the liability of employers and non-employer contribution entities to plan members for benefits provided through a defined benefit pension plan.
<i>Non-Employer Contribution Entities</i>	Non-employer contribution entities are entities that make contributions to a pension plan that is used to provide pensions to the employees of other entities. For purposes of the GASB accounting statements, plan members are not considered non-employer contribution entities.
<i>Normal Cost</i>	The actuarial present value of the pension trust benefits allocated to the current year by the actuarial cost method.

Glossary of Terms

<i>Other Postemployment Benefits (OPEB)</i>	All postemployment benefits other than retirement income (such as death benefits, life insurance, disability, and long-term care) that are provided separately from a pension plan, as well as postemployment healthcare benefits regardless of the manner in which they are provided. Other post-employment benefits do not include termination benefits.
<i>Real Rate of Return</i>	The real rate of return is the rate of return on an investment after adjustment to eliminate inflation.
<i>Service Cost</i>	The service cost is the portion of the actuarial present value of projected benefit payments that is attributed to a valuation year.
<i>Total Pension Expense</i>	<p>The total pension expense is the sum of the following items that are recognized at the end of the employer’s fiscal year:</p> <ol style="list-style-type: none">1. Service Cost2. Interest on the Total Pension Liability3. Current-Period Benefit Changes4. Employee Contributions (made negative for addition here)5. Projected Earnings on Plan Investments (made negative for addition here)6. Pension Plan Administrative Expense7. Other Changes in Plan Fiduciary Net Position8. Recognition of Outflow (Inflow) of Resources due to Liabilities9. Recognition of Outflow (Inflow) of Resources due to Assets
<i>Total Pension Liability (TPL)</i>	The TPL is the portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service.
<i>Unfunded Actuarial Accrued Liability (UAAL)</i>	The UAAL is the difference between actuarial accrued liability and valuation assets.
<i>Valuation Assets</i>	The valuation assets are the assets used in determining the unfunded liability of the plan. For purposes of GASB Statement Nos. 67 and 68, the valuation assets are equal to the market value of assets.