

# Wisconsin Retirement System

GASB Statement No. 68

Employer Reporting Accounting Schedules

December 31, 2019



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August 28, 2020

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 Pension Plans.”

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.

The total pension liability shown in this report is based on a roll-forward of the December 31, 2018 valuation liabilities to December 31, 2019. 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.

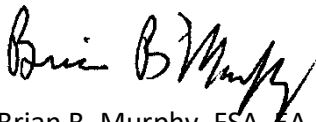
The report was based upon information, furnished by the Department of Employee Trust Funds (DETF), concerning Retirement System benefits, financial transactions, and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not audit 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, 2018 for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions.

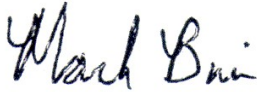
This system-wide report is intended to assist in preparation of the financial statements of WRS and its participating employers. Financial statements are the responsibility of the reporting entity and not the actuary. The statements are subject to an auditor’s review. Please let us know if the plan’s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

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.

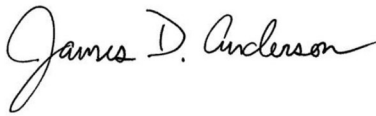
Respectfully submitted,



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**

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### **EXECUTIVE SUMMARY**

# Executive Summary as of December 31, 2019

	<b>2019</b>
Actuarial Valuation Date	December 31, 2018
Measurement Date of the Net Pension Liability/(Asset)	December 31, 2019

**Membership as of December 31, 2018**

Number of	
- Retirees and Beneficiaries	211,126
- Inactive, Nonretired Members	167,778
- Active Members	256,933
- Total	635,837
Covered Payroll <sup>(1)</sup>	\$ 14,832,491,878

**Net Pension Liability/(Asset)**

Total Pension Liability	\$ 108,868,301,876
Plan Fiduciary Net Position	112,092,758,422
Net Pension Liability/(Asset)	\$ (3,224,456,546)
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	102.96%
Net Pension Liability/(Asset) as a Percentage of Covered Payroll	-21.74%

**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 <sup>(2)</sup>	2.75%
Last year ending December 31 in the 2020 to 2119 projection period for which projected benefit payments are fully funded	2119

**Total Pension Expense** \$ 1,216,136,158

**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	\$ 6,120,755,681	\$ 3,063,028,603
Changes in assumptions	251,270,811	-
Net difference between projected and actual earnings on pension plan investments	-	6,591,935,544
Total	\$ 6,372,026,492	\$ 9,654,964,147

<sup>(1)</sup> Covered payroll is for 2019 and was provided by DETF.

<sup>(2)</sup> 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, 2019. 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 2119. 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, 2018 with roll-forward to December 31, 2019 and a measurement date of December 31, 2019. 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 2.75% (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 asset values used in this study are taken from the December 31, 2018 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, 2018 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

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### 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, 2019

### A. Expense

1. Service Cost	\$ 1,902,507,977
2. Interest on the Total Pension Liability	6,888,058,586
3. Current-Period Benefit Changes	0
4. Employee Contributions (made negative for addition here)	(987,662,027)
5. Projected Earnings on Plan Investments (made negative for addition here)	(6,642,310,421)
6. Pension Plan Administrative Expense	34,197,722
7. Other Changes in Plan Fiduciary Net Position	3,901,654
8. Recognition of Outflow (Inflow) of Resources due to Liabilities	636,981,377
9. Recognition of Outflow (Inflow) of Resources due to Assets	<u>(619,538,710)</u>
<b>10. Total Pension Expense</b>	<b>\$ 1,216,136,158</b>

# Statement of Outflows and Inflows Arising from Current Reporting Period Fiscal Year Ended December 31, 2019

## A. Outflows (Inflows) of Resources due to Liabilities

1. Difference between expected and actual experience of the Total Pension Liability (gains) or losses <sup>(1)</sup>	\$ 5,473,337,212
2. Assumption Changes (gains) or losses	\$ -
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years}	4.6706
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	\$ 1,171,870,255
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	\$ 1,171,870,255
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	\$ 4,301,466,957
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	\$ 4,301,466,957

## B. Outflows (Inflows) of Resources due to Assets

1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	\$ (12,407,231,511)
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	\$ (2,481,446,302)
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	\$ (9,925,785,209)

<sup>(1)</sup>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, 2019

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

	<u>Outflows of Resources</u>	<u>Inflows of Resources</u>	<u>Net Outflows of Resources</u>
1. Due to Liabilities	\$ 2,471,905,817	\$ 1,834,924,440	\$ 636,981,377
2. Due to Assets	-	619,538,710	(619,538,710)
<b>3. Total</b>	<b>\$ 2,471,905,817</b>	<b>\$ 2,454,463,150</b>	<b>\$ 17,442,667</b>

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

	<u>Outflows of Resources</u>	<u>Inflows of Resources</u>	<u>Net Outflows of Resources</u>
1. Differences between expected and actual experience	\$ 2,123,480,646	\$ 1,834,924,440	\$ 288,556,206
2. Assumption Changes	348,425,171	-	348,425,171
3. Net Difference between projected and actual earnings on pension plan investments	-	619,538,710	(619,538,710)
<b>4. Total</b>	<b>\$ 2,471,905,817</b>	<b>\$ 2,454,463,150</b>	<b>\$ 17,442,667</b>

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

	<u>Deferred Outflows of Resources</u>	<u>Deferred Inflows of Resources</u>	<u>Net Deferred Outflows of Resources</u>
1. Differences between expected and actual experience	\$ 6,120,755,681	\$ 3,063,028,603	\$ 3,057,727,078
2. Assumption Changes	251,270,811	-	251,270,811
3. Net Difference between projected and actual earnings on pension plan investments	-	6,591,935,544	(6,591,935,544)
<b>4. Total</b>	<b>\$ 6,372,026,492</b>	<b>\$ 9,654,964,147</b>	<b>\$ (3,282,937,655)</b>

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

<u>Year Ending December 31</u>	<u>Net Deferred Outflows of Resources</u>
2020	\$ (974,654,774)
2021	(726,801,634)
2022	114,108,864
2023	(1,695,590,111)
2024	-
Thereafter	-
<b>Total</b>	<b>\$ (3,282,937,655)</b>



# Recognition of Deferred Outflows and Inflows of Resources

## Actuarial Valuation Date - December 31, 2018

### Measurement Date - December 31, 2019

### Reporting Date - December 31, 2019

Year Established	Initial Amount	Initial Recognition Period	Current Year Recognition	Remaining Recognition	Remaining Recognition Period
<b>Deferred Outflow (Inflow) due to Differences Between Expected and Actual Experience on Liabilities</b>					
2014	\$ 437,265,852	5.3862	\$ 31,352,732	\$ -	0.0000
2015	(4,247,328,263)	5.1322	(827,584,323)	(109,406,648)	0.1322
2016	150,347,332	5.0481	29,782,954	31,215,516	1.0481
2017	4,459,497,323	5.0080	890,474,705	1,788,073,208	2.0080
2018	(4,968,302,189)	4.9321	(1,007,340,117)	(2,953,621,955)	2.9321
2019	5,473,337,212	4.6706	1,171,870,255	4,301,466,957	3.6706
<b>Total</b>			<b>\$ 288,556,206</b>	<b>\$ 3,057,727,078</b>	
<b>Deferred Outflow (Inflow) due to Assumption Changes</b>					
2014	\$ -	5.3862	\$ -	\$ -	0.0000
2015	1,412,040,786	5.1322	275,133,624	36,372,666	0.1322
2016	-	5.0481	-	-	1.0481
2017	-	5.0080	-	-	2.0080
2018	361,481,239	4.9321	73,291,547	214,898,145	2.9321
2019	-	4.6706	-	-	3.6706
<b>Total</b>			<b>\$ 348,425,171</b>	<b>\$ 251,270,811</b>	
<b>Deferred Outflow (Inflow) due to Differences Between Projected and Actual Earnings on Plan Investments</b>					
2015	\$ 7,200,807,140	5.0000	\$ 1,440,161,428	\$ -	0.0000
2016	(1,015,847,753)	5.0000	(203,169,551)	(203,169,549)	1.0000
2017	(8,311,360,334)	5.0000	(1,662,272,067)	(3,324,544,133)	2.0000
2018	11,435,938,911	5.0000	2,287,187,782	6,861,563,347	3.0000
2019	(12,407,231,511)	5.0000	(2,481,446,302)	(9,925,785,209)	4.0000
<b>Total</b>			<b>\$ (619,538,710)</b>	<b>\$ (6,591,935,544)</b>	

### 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 2,969,730 years. Additionally, the total plan membership (active employees and inactive employees) was 635,837. 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 4.6706 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, 2019

<b>A. Total pension liability</b>	
1. Service Cost	\$ 1,902,507,977
2. Interest on the total pension liability	6,888,058,586
3. Changes of benefit terms	-
4. Difference between expected and actual experience of the total pension liability	5,473,337,212
5. Changes of assumptions	-
6. Benefit payments, including refunds of employee contributions	(5,690,369,699)
7. Net change in total pension liability	\$ 8,573,534,076
8. Total pension liability – beginning	100,294,767,800
9. Total pension liability – ending	<u><u>\$ 108,868,301,876</u></u>
<b>B. Plan fiduciary net position</b>	
1. Contributions – employer	\$ 1,046,942,283
2. Contributions – employee	987,662,027
3. Net investment income	19,049,541,932
4. Benefit payments, including refunds of employee contributions	(5,690,369,699)
5. Pension plan administrative expense	(34,197,722)
6. Other	(3,901,654)
7. Net change in plan fiduciary net position	\$ 15,355,677,167
8. Plan fiduciary net position – beginning	96,737,081,255
9. Plan fiduciary net position – ending	<u><u>\$ 112,092,758,422</u></u>
<b>C. Net pension liability/(asset)</b>	<u><u>\$ (3,224,456,546)</u></u>
<b>D. Plan fiduciary net position as a percentage of the total pension liability</b>	<b>102.96%</b>
<b>E. Covered-employee payroll<sup>(1)</sup></b>	<b>\$ 14,832,491,878</b>
<b>F. Net pension liability/(asset) as a percentage of covered-employee payroll</b>	<b>-21.74%</b>

<sup>(1)</sup>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,	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
<b>Total Pension Liability</b>										
Service Cost	\$ 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	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 <sup>(1)</sup>	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	(5,646,263,647)	(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	(44,106,052)	(40,234,768)	(38,358,098)	(39,275,602)	(37,642,404)	(34,401,181)	(33,271,143)			
<b>Net Change in Total Pension Liability</b>	<b>8,573,534,076</b>	<b>(1,132,575,869)</b>	<b>7,679,922,998</b>	<b>3,274,690,348</b>	<b>438,477,497</b>	<b>3,708,924,980</b>	<b>5,827,662,298</b>			
<b>Total Pension Liability - Beginning<sup>(2)</sup></b>	<b>100,294,767,800</b>	<b>101,427,343,669</b>	<b>93,747,420,671</b>	<b>90,129,650,901</b>	<b>89,691,173,404</b>	<b>85,982,248,424</b>	<b>80,154,586,126</b>			
<b>Total Pension Liability - Ending (a)</b>	<b>\$ 108,868,301,876</b>	<b>\$ 100,294,767,800</b>	<b>\$ 101,427,343,669</b>	<b>\$ 93,404,341,249</b>	<b>\$ 90,129,650,901</b>	<b>\$ 89,691,173,404</b>	<b>\$ 85,982,248,424</b>			
<b>Plan Fiduciary Net Position</b>										
Employer Contributions <sup>(3)</sup>	\$ 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	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	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	(5,646,263,647)	(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	(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	(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)	-	-	-	-	-			
<b>Net Change in Plan Fiduciary Net Position</b>	<b>15,355,677,167</b>	<b>(7,659,381,072)</b>	<b>11,582,668,299</b>	<b>4,075,432,186</b>	<b>(3,642,101,238)</b>	<b>2,222,024,921</b>	<b>8,852,425,076</b>			
<b>Plan Fiduciary Net Position - Beginning<sup>(4)</sup></b>	<b>96,737,081,255</b>	<b>104,396,462,327</b>	<b>92,813,794,028</b>	<b>88,504,670,309</b>	<b>92,146,771,547</b>	<b>89,924,746,626</b>	<b>81,072,321,550</b>			
<b>Plan Fiduciary Net Position - Ending (b)</b>	<b>\$ 112,092,758,422</b>	<b>\$ 96,737,081,255</b>	<b>\$ 104,396,462,327</b>	<b>\$ 92,580,102,495</b>	<b>\$ 88,504,670,309</b>	<b>\$ 92,146,771,547</b>	<b>\$ 89,924,746,626</b>			
<b>Net Pension Liability/(Asset) - Ending (a) - (b)</b>	<b>(3,224,456,546)</b>	<b>3,557,686,545</b>	<b>(2,969,118,658)</b>	<b>824,238,754</b>	<b>1,624,980,592</b>	<b>(2,455,598,143)</b>	<b>(3,942,498,202)</b>			
<b>Plan Fiduciary Net Position as a Percentage of Total Pension Liability</b>	102.96 %	96.45 %	102.93 %	99.12 %	98.20 %	102.74 %	104.59 %			
<b>Covered-Employee Payroll<sup>(5)</sup></b>	<b>\$ 14,832,491,878</b>	<b>\$ 14,301,446,269</b>	<b>\$ 13,943,116,649</b>	<b>\$ 13,706,000,000</b>	<b>\$ 13,530,500,000</b>	<b>\$ 13,219,500,000</b>	<b>\$ 12,884,800,000</b>			
<b>Net Pension Liability/(Asset) as a Percentage of Covered-Employee Payroll</b>	(21.74)%	24.88 %	(21.29)%	6.01 %	12.01 %	(18.58)%	(30.60)%			

<sup>(1)</sup> 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.

<sup>(2)</sup> 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.

<sup>(3)</sup> 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.

<sup>(4)</sup> 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.

<sup>(5)</sup> Covered payroll provided by DETF.



# Schedule of Contributions Multiyear

## Last 10 Fiscal Years

<u>FY Ending December 31,</u>	<u>Actuarially Determined Contribution<sup>(1),(2)</sup></u>	<u>Actual Contribution</u>	<u>Contribution Deficiency (Excess)</u>	<u>Covered Payroll<sup>(3)</sup></u>	<u>Actual Contribution as a % of Covered Payroll</u>
2010					
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%

<sup>(1)</sup> 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.

<sup>(2)</sup> 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.

<sup>(3)</sup> Covered payroll provided by DETF.

# Notes to Schedule of Contributions

## Summary of Actuarial Methods and Assumptions Used in the Calculation of the 2019 Contribution Rate

**Valuation Date:** December 31, 2017

**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 2.7% -- approximate; No explicit price inflation assumption is used in this valuation.
Salary Increases	3.2% to 8.8% including inflation
Net Investment Rate of Return	5.50%
Weighted based on assumed rate for:	
Retired participants	5.00%
Active participants	
Post-retirement participants	5.00%
Pre-retirement participants	7.20%
Retirement Age	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2015 valuation pursuant to an experience study of the period 2012 - 2014.
Mortality	Wisconsin 2012 mortality table adjusted for future mortality improvements using the MP-2015 fully generational improvement scale (multiplied by 50%)

**Other Information:**

Notes The actuarially determined contribution for calendar year 2019 was determined from the December 31, 2017 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	<b>6.00%</b>	<b>7.00%</b>	<b>8.00%</b>
Ultimate Dividend Rate	<b>1.90%</b>	<b>1.90%</b>	<b>1.90%</b>
Total Pension Liability	\$ 120,396,310,214	\$ 108,868,301,876	\$ 100,249,789,927
Plan Fiduciary Net Position	112,092,758,422	112,092,758,422	112,092,758,422
Net Pension Liability/(Asset)	\$ 8,303,551,792	\$ (3,224,456,546)	\$ (11,842,968,495)

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	<b>6.00%</b>	<b>7.00%</b>	<b>8.00%</b>
Ultimate Dividend Rate	<b>1.00%</b>	<b>1.90%</b>	<b>2.90%</b>
Total Pension Liability	\$ 113,514,717,012	\$ 108,868,301,876	\$ 105,347,915,544
Plan Fiduciary Net Position	112,092,758,422	112,092,758,422	112,092,758,422
Net Pension Liability/(Asset)	\$ 1,421,958,590	\$ (3,224,456,546)	\$ (6,744,842,878)

## SECTION C

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### **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 2.75%; 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 2018 actuarial valuation (14.10%). Expected contribution rates gradually increase 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 12.70% 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, 2119

Year	Payroll for Current Employees	Contributions from Current Employees	Normal Cost Contributions	UAL Contributions	Total Contributions
0	\$ 13,988,805,822				
1	13,524,858,380	\$ 920,013,336	\$ 1,000,682,564	\$ -	\$ 1,920,695,900
2	13,111,088,833	885,541,827	963,188,501	-	1,848,730,329
3	12,713,441,456	834,150,318	907,290,847	-	1,741,441,164
4	12,323,236,890	784,767,505	853,578,017	-	1,638,345,521
5	11,938,748,595	760,282,548	826,946,154	-	1,587,228,702
6	11,556,909,686	708,088,798	770,175,916	-	1,478,264,714
7	11,176,756,683	684,796,924	744,841,749	-	1,429,638,673
8	10,798,761,831	661,637,279	719,651,404	-	1,381,288,684
9	10,421,757,335	638,538,314	694,527,060	-	1,333,065,374
10	10,043,277,245	615,348,939	669,304,378	-	1,284,653,317
11	9,661,043,509	591,929,579	643,831,547	-	1,235,761,126
12	9,273,675,312	568,195,632	618,016,544	-	1,186,212,176
13	8,879,581,372	544,049,601	591,753,324	-	1,135,802,924
14	8,479,853,754	519,558,396	565,114,664	-	1,084,673,060
15	8,075,784,722	494,801,193	538,186,684	-	1,032,987,877
16	7,665,343,278	469,653,554	510,834,033	-	980,487,587
17	7,249,189,077	444,155,897	483,100,672	-	927,256,569
18	6,828,505,226	418,380,708	455,065,447	-	873,446,155
19	6,404,277,512	392,388,388	426,794,051	-	819,182,439
20	5,978,538,651	366,303,481	398,421,949	-	764,725,431
21	5,553,610,274	340,268,232	370,103,860	-	710,372,092
22	5,129,682,079	314,294,264	341,852,424	-	656,146,688
23	4,704,601,586	288,249,694	313,524,197	-	601,773,891
24	4,276,368,144	262,011,944	284,985,852	-	546,997,796
25	3,845,188,445	235,593,679	256,251,162	-	491,844,841
26	3,415,136,289	209,244,497	227,591,613	-	436,836,110
27	2,990,940,794	183,254,151	199,322,365	-	382,576,516
28	2,576,734,916	170,928,596	185,916,072	-	356,844,667
29	2,179,135,457	144,553,699	157,228,553	-	301,782,252
30	1,810,132,348	120,075,751	130,604,314	-	250,680,065
31	1,479,379,733	98,135,162	106,739,916	-	204,875,078
32	1,189,615,705	78,913,566	85,832,918	-	164,746,485
33	942,083,084	62,493,405	67,972,994	-	130,466,398
34	736,661,312	48,866,681	53,151,442	-	102,018,123
35	570,037,757	37,813,651	41,129,252	-	78,942,903
36	436,478,268	28,953,936	31,492,694	-	60,446,630
37	329,968,544	21,888,577	23,807,826	-	45,696,402
38	246,079,462	16,323,766	17,755,077	-	34,078,843
39	181,626,448	12,048,253	13,104,676	-	25,152,929
40	132,922,621	8,817,468	9,590,607	-	18,408,074
41	96,387,513	6,393,899	6,954,533	-	13,348,432
42	69,342,143	4,599,835	5,003,161	-	9,602,996
43	49,601,496	3,290,332	3,578,838	-	6,869,170
44	35,269,598	2,339,621	2,544,765	-	4,884,386
45	24,962,438	1,655,892	1,801,085	-	3,456,977
46	17,404,876	1,154,558	1,255,793	-	2,410,351
47	11,827,239	784,564	853,356	-	1,637,920
48	7,800,809	517,469	562,842	-	1,080,312
49	4,848,676	321,639	349,841	-	671,479
50	2,736,160	181,504	197,419	-	378,923





# Single Discount Rate Development

## Projection of Contributions Ending December 31, 2119

### (Concluded)

Year	Payroll for Current Employees	Contributions from Current Employees	Normal Cost Contributions	UAL Contributions	Total Contributions
51	\$ 1,364,261	\$ 90,499	\$ 98,434	-	\$ 188,933
52	605,474	40,164	43,686	-	83,851
53	262,318	17,401	18,927	-	36,328
54	115,533	7,664	8,336	-	16,000
55	39,052	2,591	2,818	-	5,409
56	7,309	485	527	-	1,012
57	-	-	-	-	-
58	-	-	-	-	-
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, 2119

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	\$ 112,092,758,422	\$ 1,920,695,900	\$ 5,894,303,639	\$ 7,709,769,022	\$ 115,828,919,705
2	115,828,919,705	1,848,730,329	6,173,649,869	7,959,212,361	119,463,212,526
3	119,463,212,526	1,741,441,164	6,474,066,713	8,199,584,492	122,930,171,469
4	122,930,171,469	1,638,345,521	6,717,146,230	8,430,360,408	126,281,731,168
5	126,281,731,168	1,587,228,702	7,068,900,963	8,651,107,565	129,451,166,473
6	129,451,166,473	1,478,264,714	7,338,236,802	8,859,951,480	132,451,145,865
7	132,451,145,865	1,429,638,673	7,599,918,401	9,059,272,959	135,340,139,096
8	135,340,139,096	1,381,288,684	7,862,966,767	9,250,787,877	138,109,248,889
9	138,109,248,889	1,333,065,374	8,130,913,096	9,433,746,784	140,745,147,951
10	140,745,147,951	1,284,653,317	8,405,173,151	9,607,157,202	143,231,785,319
11	143,231,785,319	1,235,761,126	8,676,738,465	9,770,195,502	145,561,003,482
12	145,561,003,482	1,186,212,176	8,938,452,267	9,922,530,831	147,731,294,223
13	147,731,294,223	1,135,802,924	9,191,995,018	10,063,992,789	149,739,094,919
14	149,739,094,919	1,084,673,060	9,434,737,265	10,194,427,274	151,583,457,988
15	151,583,457,988	1,032,987,877	9,676,237,746	10,313,444,744	153,253,652,862
16	153,253,652,862	980,487,587	9,914,475,698	10,420,354,651	154,740,019,401
17	154,740,019,401	927,256,569	10,141,876,417	10,514,744,320	156,040,143,873
18	156,040,143,873	873,446,155	10,353,526,406	10,596,619,060	157,156,682,681
19	157,156,682,681	819,182,439	10,548,719,433	10,666,193,458	158,093,339,145
20	158,093,339,145	764,725,431	10,733,498,705	10,723,527,758	158,848,093,629
21	158,848,093,629	710,372,092	10,906,589,538	10,768,534,663	159,420,410,845
22	159,420,410,845	656,146,688	11,064,046,065	10,801,313,307	159,813,824,775
23	159,813,824,775	601,773,891	11,211,771,899	10,821,898,464	160,025,725,231
24	160,025,725,231	546,997,796	11,350,201,582	10,830,083,663	160,052,605,107
25	160,052,605,107	491,844,841	11,479,696,078	10,825,611,897	159,890,365,767
26	159,890,365,767	436,836,110	11,600,277,866	10,808,213,417	159,535,137,427
27	159,535,137,427	382,576,516	11,709,447,542	10,777,724,151	158,985,990,552
28	158,985,990,552	356,844,667	11,805,574,480	10,735,090,948	158,272,351,687
29	158,272,351,687	301,782,252	11,883,051,193	10,680,575,815	157,371,658,561
30	157,371,658,561	250,680,065	11,938,663,922	10,613,855,445	156,297,530,148
31	156,297,530,148	204,875,078	11,968,961,267	10,536,047,924	155,069,491,882
32	155,069,491,882	164,746,485	11,967,391,040	10,448,758,527	153,715,605,854
33	153,715,605,854	130,466,398	11,933,254,921	10,353,981,551	152,266,798,883
34	152,266,798,883	102,018,123	11,867,919,890	10,253,834,265	150,754,731,380
35	150,754,731,380	78,942,903	11,770,448,139	10,150,549,378	149,213,775,523
36	149,213,775,523	60,446,630	11,643,194,758	10,046,424,588	147,677,451,983
37	147,677,451,983	45,696,402	11,488,108,664	9,943,710,622	146,178,750,344
38	146,178,750,344	34,078,843	11,304,962,393	9,844,703,475	144,752,570,269
39	144,752,570,269	25,152,929	11,094,772,467	9,751,795,971	143,434,746,702
40	143,434,746,702	18,408,074	10,858,808,908	9,667,435,288	142,261,781,156
41	142,261,781,156	13,348,432	10,595,654,098	9,594,208,250	141,273,683,739
42	141,273,683,739	9,602,996	10,304,547,657	9,534,928,960	140,513,668,038
43	140,513,668,038	6,869,170	9,990,243,689	9,492,448,380	140,022,741,900
44	140,022,741,900	4,884,386	9,659,742,504	9,469,387,157	139,837,270,939
45	139,837,270,939	3,456,977	9,316,898,084	9,468,151,681	139,991,981,512
46	139,991,981,512	2,410,351	8,963,359,547	9,491,109,978	140,522,142,294
47	140,522,142,294	1,637,920	8,600,649,406	9,540,674,801	141,463,805,610
48	141,463,805,610	1,080,312	8,230,225,741	9,619,317,601	142,853,977,780
49	142,853,977,780	671,479	7,853,564,050	9,729,575,777	144,730,660,987
50	144,730,660,987	378,923	7,471,670,934	9,874,073,730	147,133,442,707



# Single Discount Rate Development Projection of Plan Fiduciary Net Position Ending December 31, 2119 (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	\$ 147,133,442,707	\$ 188,933	\$ 7,085,390,839	\$ 10,055,553,056	\$ 150,103,793,856
52	150,103,793,856	83,851	6,695,669,329	10,276,883,575	153,685,091,952
53	153,685,091,952	36,328	6,303,705,407	10,541,059,518	157,922,482,391
54	157,922,482,391	16,000	5,910,931,500	10,851,190,731	162,862,757,622
55	162,862,757,622	5,409	5,518,824,696	11,210,501,261	168,554,439,595
56	168,554,439,595	1,012	5,128,898,183	11,622,335,456	175,047,877,880
57	175,047,877,880	-	4,742,862,630	12,090,158,829	182,395,174,079
58	182,395,174,079	-	4,362,577,652	12,617,554,425	190,650,150,852
59	190,650,150,852	-	3,989,967,762	13,208,223,576	199,868,406,667
60	199,868,406,667	-	3,627,002,046	13,865,990,423	210,107,395,044
61	210,107,395,044	-	3,275,659,114	14,594,808,633	221,426,544,563
62	221,426,544,563	-	2,937,839,599	15,398,772,807	233,887,477,771
63	233,887,477,771	-	2,615,341,014	16,282,134,677	247,554,271,434
64	247,554,271,434	-	2,309,820,542	17,249,322,595	262,493,773,488
65	262,493,773,488	-	2,022,705,154	18,304,966,818	278,776,035,151
66	278,776,035,151	-	1,755,152,825	19,453,931,086	296,474,813,413
67	296,474,813,413	-	1,508,077,918	20,701,346,929	315,668,082,423
68	315,668,082,423	-	1,282,164,002	22,052,649,015	336,438,567,436
69	336,438,567,436	-	1,077,865,974	23,513,612,461	358,874,313,924
70	358,874,313,924	-	895,400,078	25,090,393,010	383,069,306,855
71	383,069,306,855	-	734,688,454	26,789,572,288	409,124,190,689
72	409,124,190,689	-	595,295,133	28,618,210,408	437,147,105,964
73	437,147,105,964	-	476,379,012	30,583,906,148	467,254,633,101
74	467,254,633,101	-	376,651,403	32,694,864,479	499,572,846,176
75	499,572,846,176	-	294,393,308	34,959,969,735	534,238,422,603
76	534,238,422,603	-	227,580,459	37,388,858,984	571,399,701,129
77	571,399,701,129	-	174,066,031	39,991,989,807	611,217,624,906
78	611,217,624,906	-	131,743,857	42,780,700,695	653,866,581,744
79	653,866,581,744	-	98,664,443	45,767,265,872	699,535,183,173
80	699,535,183,173	-	73,097,969	48,964,947,664	748,427,032,868
81	748,427,032,868	-	53,555,083	52,388,049,575	800,761,527,360
82	800,761,527,360	-	38,781,735	56,051,972,512	856,774,718,137
83	856,774,718,137	-	27,738,511	59,973,275,842	916,720,255,468
84	916,720,255,468	-	19,579,469	64,169,744,192	980,870,420,190
85	980,870,420,190	-	13,623,981	68,660,460,639	1,049,517,256,848
86	1,049,517,256,848	-	9,333,094	73,465,886,846	1,122,973,810,600
87	1,122,973,810,600	-	6,288,277	78,607,950,375	1,201,575,472,697
88	1,201,575,472,697	-	4,163,116	84,110,139,844	1,285,681,449,426
89	1,285,681,449,426	-	2,705,263	89,997,608,377	1,375,676,352,540
90	1,375,676,352,540	-	1,723,442	96,297,285,378	1,471,971,914,476
91	1,471,971,914,476	-	1,073,725	103,037,997,069	1,575,008,837,819
92	1,575,008,837,819	-	651,276	110,250,596,238	1,685,258,782,782
93	1,685,258,782,782	-	382,009	117,968,101,651	1,803,226,502,423
94	1,803,226,502,423	-	213,572	126,225,847,821	1,929,452,136,672
95	1,929,452,136,672	-	110,670	135,061,645,759	2,064,513,671,761
96	2,064,513,671,761	-	51,657	144,515,955,246	2,209,029,575,351
97	2,209,029,575,351	-	21,962	154,632,069,519	2,363,661,622,907
98	2,363,661,622,907	-	9,086	165,456,313,291	2,529,117,927,112
99	2,529,117,927,112	-	4,736	177,038,254,735	2,706,156,177,110
100	2,706,156,177,110	-	-	189,430,932,398	2,895,587,109,508



# Single Discount Rate Development

## Present Values of Projected Benefits Ending December 31, 2119

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 <sup>((a)-.5)</sup>	(g)=(e)*vf <sup>^((a)-.5)</sup>	(h)=(c)/(1+sdr) <sup>^((a)-.5)</sup>
1	\$ 112,092,758,422	\$ 5,894,303,639	\$ 5,894,303,639	\$ -	\$ 5,698,238,405	\$ -	\$ 5,698,238,405
2	115,828,919,705	6,173,649,869	6,173,649,869	-	5,577,843,550	-	5,577,843,550
3	119,463,212,526	6,474,066,713	6,474,066,713	-	5,466,605,402	-	5,466,605,402
4	122,930,171,469	6,717,146,230	6,717,146,230	-	5,300,801,982	-	5,300,801,982
5	126,281,731,168	7,068,900,963	7,068,900,963	-	5,213,446,216	-	5,213,446,216
6	129,451,166,473	7,338,236,802	7,338,236,802	-	5,058,024,689	-	5,058,024,689
7	132,451,145,865	7,599,918,401	7,599,918,401	-	4,895,695,235	-	4,895,695,235
8	135,340,139,096	7,862,966,767	7,862,966,767	-	4,733,780,404	-	4,733,780,404
9	138,109,248,889	8,130,913,096	8,130,913,096	-	4,574,853,687	-	4,574,853,687
10	140,745,147,951	8,405,173,151	8,405,173,151	-	4,419,781,264	-	4,419,781,264
11	143,231,785,319	8,676,738,465	8,676,738,465	-	4,264,094,702	-	4,264,094,702
12	145,561,003,482	8,938,452,267	8,938,452,267	-	4,105,337,648	-	4,105,337,648
13	147,731,294,223	9,191,995,018	9,191,995,018	-	3,945,595,496	-	3,945,595,496
14	149,739,094,919	9,434,737,265	9,434,737,265	-	3,784,851,216	-	3,784,851,216
15	151,583,457,988	9,676,237,746	9,676,237,746	-	3,627,786,782	-	3,627,786,782
16	153,253,652,862	9,914,475,698	9,914,475,698	-	3,473,931,083	-	3,473,931,083
17	154,740,019,401	10,141,876,417	10,141,876,417	-	3,321,130,816	-	3,321,130,816
18	156,040,143,873	10,353,526,406	10,353,526,406	-	3,168,634,788	-	3,168,634,788
19	157,156,682,681	10,548,719,433	10,548,719,433	-	3,017,170,510	-	3,017,170,510
20	158,093,339,145	10,733,498,705	10,733,498,705	-	2,869,178,999	-	2,869,178,999
21	158,848,093,629	10,906,589,538	10,906,589,538	-	2,724,717,785	-	2,724,717,785
22	159,420,410,845	11,064,046,065	11,064,046,065	-	2,583,228,093	-	2,583,228,093
23	159,813,824,775	11,211,771,899	11,211,771,899	-	2,446,466,401	-	2,446,466,401
24	160,025,725,231	11,350,201,582	11,350,201,582	-	2,314,647,169	-	2,314,647,169
25	160,052,605,107	11,479,696,078	11,479,696,078	-	2,187,901,858	-	2,187,901,858
26	159,890,365,767	11,600,277,866	11,600,277,866	-	2,066,246,168	-	2,066,246,168
27	159,535,137,427	11,709,447,542	11,709,447,542	-	1,949,244,407	-	1,949,244,407
28	158,985,990,552	11,805,574,480	11,805,574,480	-	1,836,678,910	-	1,836,678,910
29	158,272,351,687	11,883,051,193	11,883,051,193	-	1,727,787,406	-	1,727,787,406
30	157,371,658,561	11,938,663,922	11,938,663,922	-	1,622,311,643	-	1,622,311,643
31	156,297,530,148	11,968,961,267	11,968,961,267	-	1,520,026,789	-	1,520,026,789
32	155,069,491,882	11,967,391,040	11,967,391,040	-	1,420,399,416	-	1,420,399,416
33	153,715,605,854	11,933,254,921	11,933,254,921	-	1,323,689,560	-	1,323,689,560
34	152,266,798,883	11,867,919,890	11,867,919,890	-	1,230,319,914	-	1,230,319,914
35	150,754,731,380	11,770,448,139	11,770,448,139	-	1,140,388,077	-	1,140,388,077
36	149,213,775,523	11,643,194,758	11,643,194,758	-	1,054,260,789	-	1,054,260,789
37	147,677,451,983	11,488,108,664	11,488,108,664	-	972,166,495	-	972,166,495
38	146,178,750,344	11,304,962,393	11,304,962,393	-	894,082,221	-	894,082,221
39	144,752,570,269	11,094,772,467	11,094,772,467	-	820,054,959	-	820,054,959
40	143,434,746,702	10,858,808,908	10,858,808,908	-	750,106,575	-	750,106,575
41	142,261,781,156	10,595,654,098	10,595,654,098	-	684,045,162	-	684,045,162
42	141,273,683,739	10,304,547,657	10,304,547,657	-	621,730,479	-	621,730,479
43	140,513,668,038	9,990,243,689	9,990,243,689	-	563,333,438	-	563,333,438
44	140,022,741,900	9,659,742,504	9,659,742,504	-	509,062,634	-	509,062,634
45	139,837,270,939	9,316,898,084	9,316,898,084	-	458,873,775	-	458,873,775
46	139,991,981,512	8,963,359,547	8,963,359,547	-	412,580,723	-	412,580,723
47	140,522,142,294	8,600,649,406	8,600,649,406	-	369,986,248	-	369,986,248
48	141,463,805,610	8,230,225,741	8,230,225,741	-	330,888,983	-	330,888,983
49	142,853,977,780	7,853,564,050	7,853,564,050	-	295,089,375	-	295,089,375
50	144,730,660,987	7,471,670,934	7,471,670,934	-	262,373,967	-	262,373,967



# Single Discount Rate Development

## Present Values of Projected Benefits Ending December 31, 2119 (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 <sup>-(a)-.5</sup>	(g)=(e)*vf <sup>-(a)-.5</sup>	(h)=(c)/(1+sdr) <sup>-(a)-.5</sup>
51	\$ 147,133,442,707	\$ 7,085,390,839	\$ 7,085,390,839	\$ -	\$ 232,532,167	\$ -	\$ 232,532,167
52	150,103,793,856	6,695,669,329	6,695,669,329	-	205,366,427	-	205,366,427
53	153,685,091,952	6,303,705,407	6,303,705,407	-	180,695,601	-	180,695,601
54	157,922,482,391	5,910,931,500	5,910,931,500	-	158,352,097	-	158,352,097
55	162,862,757,622	5,518,824,696	5,518,824,696	-	138,175,395	-	138,175,395
56	168,554,439,595	5,128,898,183	5,128,898,183	-	120,011,929	-	120,011,929
57	175,047,877,880	4,742,862,630	4,742,862,630	-	103,718,710	-	103,718,710
58	182,395,174,079	4,362,577,652	4,362,577,652	-	89,161,210	-	89,161,210
59	190,650,150,852	3,989,967,762	3,989,967,762	-	76,211,128	-	76,211,128
60	199,868,406,667	3,627,002,046	3,627,002,046	-	64,746,013	-	64,746,013
61	210,107,395,044	3,275,659,114	3,275,659,114	-	54,648,740	-	54,648,740
62	221,426,544,563	2,937,839,599	2,937,839,599	-	45,806,357	-	45,806,357
63	233,887,477,771	2,615,341,014	2,615,341,014	-	38,110,287	-	38,110,287
64	247,554,271,434	2,309,820,542	2,309,820,542	-	31,456,352	-	31,456,352
65	262,493,773,488	2,022,705,154	2,022,705,154	-	25,744,172	-	25,744,172
66	278,776,035,151	1,755,152,825	1,755,152,825	-	20,877,452	-	20,877,452
67	296,474,813,413	1,508,077,918	1,508,077,918	-	16,764,962	-	16,764,962
68	315,668,082,423	1,282,164,002	1,282,164,002	-	13,321,054	-	13,321,054
69	336,438,567,436	1,077,865,974	1,077,865,974	-	10,465,886	-	10,465,886
70	358,874,313,924	895,400,078	895,400,078	-	8,125,397	-	8,125,397
71	383,069,306,855	734,688,454	734,688,454	-	6,230,844	-	6,230,844
72	409,124,190,689	595,295,133	595,295,133	-	4,718,373	-	4,718,373
73	437,147,105,964	476,379,012	476,379,012	-	3,528,814	-	3,528,814
74	467,254,633,101	376,651,403	376,651,403	-	2,607,546	-	2,607,546
75	499,572,846,176	294,393,308	294,393,308	-	1,904,743	-	1,904,743
76	534,238,422,603	227,580,459	227,580,459	-	1,376,131	-	1,376,131
77	571,399,701,129	174,066,031	174,066,031	-	983,683	-	983,683
78	611,217,624,906	131,743,857	131,743,857	-	695,805	-	695,805
79	653,866,581,744	98,664,443	98,664,443	-	487,006	-	487,006
80	699,535,183,173	73,097,969	73,097,969	-	337,206	-	337,206
81	748,427,032,868	53,555,083	53,555,083	-	230,891	-	230,891
82	800,761,527,360	38,781,735	38,781,735	-	156,261	-	156,261
83	856,774,718,137	27,738,511	27,738,511	-	104,453	-	104,453
84	916,720,255,468	19,579,469	19,579,469	-	68,906	-	68,906
85	980,870,420,190	13,623,981	13,623,981	-	44,810	-	44,810
86	1,049,517,256,848	9,333,094	9,333,094	-	28,689	-	28,689
87	1,122,973,810,600	6,288,277	6,288,277	-	18,065	-	18,065
88	1,201,575,472,697	4,163,116	4,163,116	-	11,177	-	11,177
89	1,285,681,449,426	2,705,263	2,705,263	-	6,788	-	6,788
90	1,375,676,352,540	1,723,442	1,723,442	-	4,042	-	4,042
91	1,471,971,914,476	1,073,725	1,073,725	-	2,353	-	2,353
92	1,575,008,837,819	651,276	651,276	-	1,334	-	1,334
93	1,685,258,782,782	382,009	382,009	-	731	-	731
94	1,803,226,502,423	213,572	213,572	-	382	-	382
95	1,929,452,136,672	110,670	110,670	-	185	-	185
96	2,064,513,671,761	51,657	51,657	-	81	-	81
97	2,209,029,575,351	21,962	21,962	-	32	-	32
98	2,363,661,622,907	9,086	9,086	-	12	-	12
99	2,706,156,181,846	4,736	4,736	-	6	-	6
100	2,706,156,177,110	-	-	-	-	-	-
<b>Totals</b>					<b>\$ 125,267,312,973</b>	<b>\$ -</b>	<b>\$ 125,267,312,973</b>



## **SECTION D**

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### **SUMMARY OF ASSUMPTIONS**

# Summary of Assumptions Used to Develop Total Pension Liability Assumptions Adopted by ETF 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:

2019: 0.0% Core, -10.0% Variable  
2020: 1.7% Core, 21.0% Variable  
2021: 3.2% Core, 1.9% Variable  
2022: 3.4% Core, 1.9% Variable  
2023: 2.0% Core, 1.9% Variable  
2024: 3.7% Core, 1.9% Variable  
2025 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.

<b>% Merit and Longevity Increase Next Year</b>						
<b>Service</b>	<b>Gen.</b>	<b>Exec. &amp; Elec.</b>	<b>University Teachers</b>	<b>Public School Teachers</b>	<b>Protective</b>	
					<b>With S.S.</b>	<b>W/O S.S.</b>
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 2018	Present Value of \$1 Monthly for Life*		Future Life Expectancy (years)*		Mortality Rates*	
	Males	Females	Males	Females	Males	Females
40	\$212.90	\$217.57	45.2	48.2	0.000978	0.000608
45	204.56	210.20	40.2	43.1	0.001233	0.000919
50	194.06	201.08	35.2	38.1	0.001621	0.001343
55	181.39	189.85	30.3	33.1	0.003778	0.002415
60	167.14	176.59	25.7	28.3	0.005441	0.003507
65	150.16	160.61	21.3	23.7	0.008316	0.005262
70	130.92	141.58	17.1	19.2	0.013518	0.008775
75	109.41	119.90	13.2	14.9	0.022764	0.015900
80	86.66	96.54	9.7	11.1	0.041815	0.029897
85	65.27	73.38	6.8	7.8	0.078176	0.060047

\* With a fully generational mortality table, the mortality rate depends on the year of birth. Later years of birth will 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 2018	Present Value of \$1 Monthly for Life		Future Life Expectancy (years)		Mortality Rates*	
	Males	Females	Males	Females	Males	Females
40	\$199.47	\$207.75	37.7	41.7	0.001409	0.001010
45	187.81	198.03	32.7	36.7	0.002340	0.001532
50	174.32	186.22	28.0	31.8	0.004674	0.002715
55	158.54	172.11	23.4	27.0	0.006317	0.003984
60	140.06	155.27	19.0	22.4	0.010961	0.006118
65	119.73	135.60	15.0	17.9	0.017766	0.010514
70	97.72	113.56	11.3	13.8	0.030729	0.019083
75	75.52	90.06	8.1	10.1	0.058413	0.036082
80	55.90	67.48	5.7	7.1	0.107657	0.073711
85	39.92	49.35	3.8	4.9	0.173675	0.127108

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

## Active Participant Mortality Rates

Sample Attained Ages in 2018	Mortality Rates*	
	Males	Females
20	0.000134	0.000081
25	0.000164	0.000090
30	0.000211	0.000122
35	0.000371	0.000220
40	0.000489	0.000305
45	0.000617	0.000460
50	0.000810	0.000672
55	0.001889	0.001209
60	0.002720	0.001755
65	0.004158	0.002634
70	0.006759	0.004392
75	0.011382	0.007958
80	0.020907	0.014964

*\* With a fully generational mortality table, the mortality rate depends on the year of birth. Later years of birth will 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 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**

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### **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 <sup>#</sup>	
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.

**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).

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





## SECTION F

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### **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

<b><i>Actuarial Accrued Liability (AAL)</i></b>	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."
<b><i>Actuarial Assumptions</i></b>	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.
<b><i>Accrued Service</i></b>	Service credited under the system which was rendered before the date of the actuarial valuation.
<b><i>Actuarial Equivalent</i></b>	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.
<b><i>Actuarial Cost Method</i></b>	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.
<b><i>Actuarial Gain (Loss)</i></b>	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.
<b><i>Actuarial Present Value (APV)</i></b>	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.
<b><i>Actuarial Valuation</i></b>	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.
<b><i>Actuarial Valuation Date</i></b>	The date as of which an actuarial valuation is performed.
<b><i>Actuarially Determined Contribution (ADC) or Annual Required Contribution (ARC)</i></b>	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

<b><i>Amortization Payment</i></b>	The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.
<b><i>Amortization Method</i></b>	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).
<b><i>Cost-of-Living Adjustments</i></b>	Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.
<b><i>Cost-Sharing Multiple-Employer Defined Benefit Pension Plan (cost-sharing pension plan)</i></b>	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.
<b><i>Covered-Employee Payroll</i></b>	The payroll of covered employees, which is typically only the pensionable pay and does not include pay above any pay cap.
<b><i>Deferred Retirement Option Program (DROP)</i></b>	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.
<b><i>Deferred Inflows and Outflows</i></b>	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.
<b><i>Discount Rate</i></b>	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"><li>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; and</li><li>2. The present value of the benefit payments not in (1) above, discounted using the municipal bond rate.</li></ol>

## Glossary of Terms

<b><i>Entry Age Actuarial Cost Method (EAN)</i></b>	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.
<b><i>GASB</i></b>	The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities.
<b><i>Fiduciary Net Position</i></b>	The fiduciary net position is the market value of the assets of the trust dedicated to the defined benefit provisions.
<b><i>Long-Term Expected Rate of Return</i></b>	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.
<b><i>Money-Weighted Rate of Return</i></b>	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.
<b><i>Multiple-Employer Defined Benefit Pension Plan</i></b>	A multiple-employer plan is a defined benefit pension plan that is used to provide pensions to the employees of more than one employer.
<b><i>Municipal Bond Rate</i></b>	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.
<b><i>Net Pension Liability/(Asset) (NPL)</i></b>	The NPL is the liability of employers and non-employer contribution entities to plan members for benefits provided through a defined benefit pension plan.
<b><i>Non-Employer Contribution Entities</i></b>	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.
<b><i>Normal Cost</i></b>	The actuarial present value of the pension trust benefits allocated to the current year by the actuarial cost method.

## Glossary of Terms

<b><i>Other Postemployment Benefits (OPEB)</i></b>	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.
<b><i>Real Rate of Return</i></b>	The real rate of return is the rate of return on an investment after adjustment to eliminate inflation.
<b><i>Service Cost</i></b>	The service cost is the portion of the actuarial present value of projected benefit payments that is attributed to a valuation year.
<b><i>Total Pension Expense</i></b>	<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"><li>1. Service Cost</li><li>2. Interest on the Total Pension Liability</li><li>3. Current-Period Benefit Changes</li><li>4. Employee Contributions (made negative for addition here)</li><li>5. Projected Earnings on Plan Investments (made negative for addition here)</li><li>6. Pension Plan Administrative Expense</li><li>7. Other Changes in Plan Fiduciary Net Position</li><li>8. Recognition of Outflow (Inflow) of Resources due to Liabilities</li><li>9. Recognition of Outflow (Inflow) of Resources due to Assets</li></ol>
<b><i>Total Pension Liability (TPL)</i></b>	The TPL is the portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service.
<b><i>Unfunded Actuarial Accrued Liability (UAAL)</i></b>	The UAAL is the difference between actuarial accrued liability and valuation assets.
<b><i>Valuation Assets</i></b>	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.