

# Wisconsin Retirement System

GASB Statement No. 68

Employer Reporting Accounting Schedules

December 31, 2018



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August 29, 2019

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, 2017 valuation liabilities to December 31, 2018. 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.

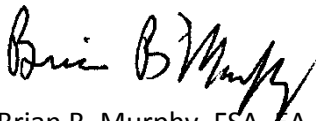
The report was based upon information, furnished by the Department of Employee Trust Funds (DETF), concerning Retirement System benefits, financial transactions, and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not audit 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, 2017 for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions.

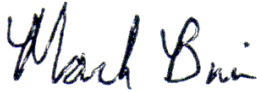
This system-wide report is intended to assist in preparation of the financial statements of WRS and its participating employers. Financial statements are the responsibility of the reporting entity and not the actuary. The statements are subject to an auditor’s review. Please let us know if the plan’s 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.

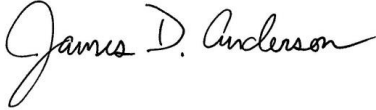
Respectfully submitted,



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, 2018

	<b>2018</b>
Actuarial Valuation Date	December 31, 2017
Measurement Date of the Net Pension Liability/(Asset)	December 31, 2018
 <b>Membership as of December 31, 2017</b>	
Number of	
- Retirees and Beneficiaries	203,202
- Inactive, Nonretired Members	165,051
- Active Members	256,383
- Total	624,636
Covered Payroll <sup>(1)</sup>	\$ 14,301,446,269
 <b>Net Pension Liability/(Asset)</b>	
Total Pension Liability	\$ 100,294,767,800
Plan Fiduciary Net Position	96,737,081,255
Net Pension Liability/(Asset)	\$ 3,557,686,545
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	96.45%
Net Pension Liability/(Asset) as a Percentage of Covered Payroll	24.88%
 <b>Development of the Single Discount Rate</b>	
Single Discount Rate	7.00%
Long-Term Expected Rate of Investment Return	7.00%
Long-Term Municipal Bond Rate <sup>(2)</sup>	3.71%
Last year ending December 31 in the 2019 to 2118 projection period for which projected benefit payments are fully funded	2118
 <b>Total Pension Expense</b>	 \$ 2,402,540,050

## 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	\$ 2,770,899,115	\$ 4,897,953,043
Changes in assumptions	599,695,982	-
Net difference between projected and actual earnings on pension plan investments	5,195,757,257	-
Total	\$ 8,566,352,354	\$ 4,897,953,043

<sup>(1)</sup> Covered payroll is for 2018 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, 2018. 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.

# 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.

While the first two tables may be built prospectively as the information becomes available, sufficient information is currently available for the third table.



## 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 2118. 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, 2017 with roll-forward to December 31, 2018 and a measurement date of December 31, 2018. 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 3.71% (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%.

## **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, 2018

### A. Expense

1. Service Cost	\$ 1,860,937,125
2. Interest on the Total Pension Liability	7,169,731,242
3. Current-Period Benefit Changes	0
4. Employee Contributions (made negative for addition here)	(972,950,131)
5. Projected Earnings on Plan Investments (made negative for addition here)	(7,386,584,334)
6. Pension Plan Administrative Expense	31,612,198
7. Other Changes in Plan Fiduciary Net Position	25,448,686
8. Recognition of Outflow (Inflow) of Resources due to Liabilities	(485,058,986)
9. Recognition of Outflow (Inflow) of Resources due to Assets	<u>2,159,404,250</u>
<b>10. Total Pension Expense</b>	<b>\$ 2,402,540,050</b>

# Statement of Outflows and Inflows Arising from Current Reporting Period Fiscal Year Ended December 31, 2018

## 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>	\$ (4,968,302,189)
2. Assumption Changes (gains) or losses	\$ 361,481,239
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years}	4.9321
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	\$ (1,007,340,117)
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes	\$ 73,291,547
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	\$ (934,048,570)
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	\$ (3,960,962,072)
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes	\$ 288,189,692
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities	\$ (3,672,772,380)

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

1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	\$ 11,435,938,911
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	\$ 2,287,187,782
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	\$ 9,148,751,129

<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, 2018

## 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	\$ 1,349,865,454	\$ 1,834,924,440	\$ (485,058,986)
2. Due to Assets	2,159,404,250	-	2,159,404,250
<b>3. Total</b>	<b>\$ 3,509,269,704</b>	<b>\$ 1,834,924,440</b>	<b>\$ 1,674,345,264</b>

## 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	\$ 1,001,440,283	\$ 1,834,924,440	\$ (833,484,157)
2. Assumption Changes	348,425,171	-	348,425,171
3. Net Difference between projected and actual earnings on pension plan investments	2,159,404,250	-	2,159,404,250
<b>4. Total</b>	<b>\$ 3,509,269,704</b>	<b>\$ 1,834,924,440</b>	<b>\$ 1,674,345,264</b>

## 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	\$ 2,770,899,115	\$ 4,897,953,043	\$ (2,127,053,928)
2. Assumption Changes	599,695,982	-	599,695,982
3. Net Difference between projected and actual earnings on pension plan investments	5,195,757,257	-	5,195,757,257
<b>4. Total</b>	<b>\$ 8,566,352,354</b>	<b>\$ 4,897,953,043</b>	<b>\$ 3,668,399,311</b>

## 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
2019	\$ 1,327,018,714
2020	334,921,273
2021	582,774,413
2022	1,423,684,911
2023	-
Thereafter	-
<b>Total</b>	<b>\$ 3,668,399,311</b>

**Recognition of Deferred Outflows and Inflows of Resources**  
**Actuarial Valuation Date - December 31, 2017**  
**Measurement Date - December 31, 2018**  
**Reporting Date - December 31, 2018**

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	\$ 81,182,624	\$ 31,352,732	0.3862
2015	(4,247,328,263)	5.1322	(827,584,323)	(936,990,971)	1.1322
2016	150,347,332	5.0481	29,782,954	60,998,470	2.0481
2017	4,459,497,323	5.0080	890,474,705	2,678,547,913	3.0080
2018	(4,968,302,189)	4.9321	(1,007,340,117)	(3,960,962,072)	3.9321
<b>Total</b>			<b>\$ (833,484,157)</b>	<b>\$ (2,127,053,928)</b>	
<b>Deferred Outflow (Inflow) due to Assumption Changes</b>					
2014	\$ -	5.3862	\$ -	\$ -	0.3862
2015	1,412,040,786	5.1322	275,133,624	311,506,290	1.1322
2016	-	5.0481	-	-	2.0481
2017	-	5.0080	-	-	3.0080
2018	361,481,239	4.9321	73,291,547	288,189,692	3.9321
<b>Total</b>			<b>\$ 348,425,171</b>	<b>\$ 599,695,982</b>	
<b>Deferred Outflow (Inflow) due to Differences Between Projected and Actual Earnings on Plan Investments</b>					
2014	\$ 1,487,483,294	5.0000	\$ 297,496,659	\$ -	0.0000
2015	7,200,807,140	5.0000	1,440,161,428	1,440,161,428	1.0000
2016	(1,015,847,753)	5.0000	(203,169,551)	(406,339,100)	2.0000
2017	(8,311,360,334)	5.0000	(1,662,272,067)	(4,986,816,200)	3.0000
2018	11,435,938,911	5.0000	2,287,187,782	9,148,751,129	4.0000
<b>Total</b>			<b>\$ 2,159,404,251</b>	<b>\$ 5,195,757,257</b>	

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

## Fiscal Year Ended December 31, 2018

<b>A. Total pension liability</b>	
1. Service Cost	\$ 1,860,937,125
2. Interest on the total pension liability	7,169,731,242
3. Changes of benefit terms	-
4. Difference between expected and actual experience of the total pension liability	(4,968,302,189)
5. Changes of assumptions	361,481,239
6. Benefit payments, including refunds of employee contributions	<u>(5,556,423,286)</u>
7. Net change in total pension liability	\$ (1,132,575,869)
8. Total pension liability – beginning	<u>101,427,343,669</u>
9. Total pension liability – ending	<u><b>\$ 100,294,767,800</b></u>
<b>B. Plan fiduciary net position</b>	
1. Contributions – employer	\$ 1,030,507,544
2. Contributions – employee	972,950,131
3. Net investment income	(4,049,354,577)
4. Benefit payments, including refunds of employee contributions	(5,556,423,286)
5. Pension plan administrative expense	(31,612,198)
6. Other	<u>(25,448,686)</u>
7. Net change in plan fiduciary net position	\$ (7,659,381,072)
8. Plan fiduciary net position – beginning	<u>104,396,462,327</u>
9. Plan fiduciary net position – ending	<u><b>\$ 96,737,081,255</b></u>
<b>C. Net pension liability/(asset)</b>	<u><b>\$ 3,557,686,545</b></u>
<b>D. Plan fiduciary net position as a percentage of the total pension liability</b>	<b>96.45%</b>
<b>E. Covered-employee payroll<sup>(1)</sup></b>	<b>\$ 14,301,446,269</b>
<b>F. Net pension liability/(asset) as a percentage of covered-employee payroll</b>	<b>24.88%</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,	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
<b>Total Pension Liability</b>										
Service Cost	\$ 1,860,937,125	\$ 1,842,879,321	\$ 1,814,134,799	\$ 1,787,870,316	\$ 1,757,020,910					
Interest on the Total Pension Liability	7,169,731,242	6,627,171,441	6,372,404,646	6,347,123,575	6,089,287,273					
Benefit Changes	-	-	-	-	-					
Experience <sup>(1)</sup>	(4,968,302,189)	4,459,497,323	150,347,332	(4,247,328,263)	437,265,852					
Assumption Changes	361,481,239	-	-	1,412,040,786	-					
Benefit Payments	(5,516,188,518)	(5,211,266,989)	(5,022,920,827)	(4,823,586,513)	(4,540,247,874)					
Refunds	(40,234,768)	(38,358,098)	(39,275,602)	(37,642,404)	(34,401,181)					
<b>Net Change in Total Pension Liability</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>Total Pension Liability - Beginning<sup>(2)</sup></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>Total Pension Liability - Ending (a)</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>Plan Fiduciary Net Position</b>										
Employer Contributions	\$ 1,030,507,544	\$ 1,017,558,990	\$ 963,121,911	\$ 977,733,921	\$ 987,792,834					
Employee Contributions	972,950,131	965,452,633	921,863,806	937,225,184	941,903,267					
Pension Plan Net Investment Income	(4,049,354,577)	14,875,414,636	7,273,069,087	(673,122,812)	4,891,014,826					
Benefit Payments	(5,516,188,518)	(5,211,266,989)	(5,022,920,827)	(4,823,586,513)	(4,540,247,874)					
Refunds	(40,234,768)	(38,358,098)	(39,275,602)	(37,642,404)	(34,401,181)					
Pension Plan Administrative Expense	(31,612,198)	(26,132,873)	(20,426,189)	(22,708,614)	(24,036,951)					
Other	(25,448,686)	-	-	-	-					
<b>Net Change in Plan Fiduciary Net Position</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>Plan Fiduciary Net Position - Beginning<sup>(3)</sup></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>Plan Fiduciary Net Position - Ending (b)</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>Net Pension Liability/(Asset) - Ending (a) - (b)</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>Plan Fiduciary Net Position as a Percentage of Total Pension Liability</b>	<b>96.45 %</b>	<b>102.93 %</b>	<b>99.12 %</b>	<b>98.20 %</b>	<b>102.74 %</b>					
<b>Covered-Employee Payroll<sup>(4)</sup></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>Net Pension Liability/(Asset) as a Percentage of Covered-Employee Payroll</b>	<b>24.88 %</b>	<b>(21.29)%</b>	<b>6.01 %</b>	<b>12.01 %</b>	<b>(18.58)%</b>					

**Notes to Schedule:**

<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> 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>(4)</sup> Covered payroll provided by DETF.

# Schedule of Contributions Multiyear

## Last 10 Fiscal Years

<b>FY Ending December 31,</b>	<b>Actuarially Determined Contribution<sup>(1)</sup></b>	<b>Actual Contribution</b>	<b>Contribution Deficiency (Excess)</b>	<b>Covered Payroll<sup>(3)</sup></b>	<b>Actual Contribution as a % of Covered Payroll</b>
2009					
2010					
2011					
2012					
2013					
2014 <sup>(2)</sup>	\$ 977,068,988	\$ 977,068,988	\$ -	\$ 13,219,500,000	7.39%
2015 <sup>(2)</sup>	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%

<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> The Actuarial Determined Contribution (ADC) included Prior Service Contributions, Early Retirement Contributions, Employer Additional Contributions, and Employer Required 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 2018 Contribution Rate

**Valuation Date:** December 31, 2016

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

Actuarial Cost Method	Frozen Entry Age
Amortization Method	Level Percentage of Payroll, Closed
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 2018 was determined from the December 31, 2016 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	\$ 110,875,700,223	\$ 100,294,767,800	\$ 92,427,023,854
Plan Fiduciary Net Position	96,737,081,255	96,737,081,255	96,737,081,255
Net Pension Liability/(Asset)	\$ 14,138,618,968	\$ 3,557,686,545	\$ (4,310,057,401)

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	\$ 104,583,875,804	\$ 100,294,767,800	\$ 97,043,314,535
Plan Fiduciary Net Position	96,737,081,255	96,737,081,255	96,737,081,255
Net Pension Liability/(Asset)	\$ 7,846,794,549	\$ 3,557,686,545	\$ 306,233,280

## 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 3.71%; and the resulting SDR is 7.00%.

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 2017 actuarial valuation (13.65%). 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 13.75% 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, 2118

Year	Payroll for Current Employees	Contributions from Current Employees	Normal Cost Contributions	UAL Contributions	Total Contributions
0	\$ 13,668,561,668				
1	13,218,016,743	\$ 866,044,457	\$ 938,214,828	\$ -	\$ 1,804,259,285
2	12,816,247,555	876,631,333	949,683,944	-	1,826,315,277
3	12,427,720,874	856,021,414	927,356,531	-	1,783,377,945
4	12,044,377,243	835,398,006	905,014,506	-	1,740,412,512
5	11,665,461,120	837,113,490	906,872,947	-	1,743,986,437
6	11,290,385,697	810,198,078	877,714,584	-	1,687,912,662
7	10,915,142,944	783,270,658	848,543,212	-	1,631,813,870
8	10,539,641,324	756,324,661	819,351,717	-	1,575,676,378
9	10,164,821,902	729,427,620	790,213,254	-	1,519,640,874
10	9,788,429,344	702,417,690	760,952,497	-	1,463,370,187
11	9,407,652,833	675,093,168	731,350,931	-	1,406,444,099
12	9,022,094,058	647,425,470	701,377,592	-	1,348,803,062
13	8,632,073,308	619,437,581	671,057,379	-	1,290,494,960
14	8,236,288,649	591,036,073	640,289,080	-	1,231,325,153
15	7,836,041,979	562,314,372	609,173,904	-	1,171,488,276
16	7,432,308,555	533,342,462	577,787,667	-	1,111,130,129
17	7,023,090,819	503,976,997	545,975,080	-	1,049,952,077
18	6,609,358,176	474,287,543	513,811,504	-	988,099,047
19	6,192,806,304	444,395,780	481,428,762	-	925,824,542
20	5,774,794,761	414,399,272	448,932,545	-	863,331,817
21	5,357,343,583	384,442,976	416,479,890	-	800,922,866
22	4,942,571,053	354,678,899	384,235,473	-	738,914,372
23	4,530,622,517	325,117,472	352,210,594	-	677,328,066
24	4,119,884,214	295,642,891	320,279,799	-	615,922,690
25	3,708,728,688	266,138,371	288,316,568	-	554,454,939
26	3,297,192,974	236,606,568	256,323,782	-	492,930,350
27	2,889,256,710	207,333,061	224,610,817	-	431,943,878
28	2,489,755,063	164,323,834	178,017,487	-	342,341,321
29	2,104,924,202	138,924,997	150,502,081	-	289,427,078
30	1,747,611,928	115,342,387	124,954,253	-	240,296,640
31	1,427,493,614	94,214,579	102,065,793	-	196,280,372
32	1,147,159,628	75,712,536	82,021,913	-	157,734,449
33	908,446,814	59,957,490	64,953,947	-	124,911,437
34	710,281,663	46,878,590	50,785,139	-	97,663,729
35	549,387,910	36,259,602	39,281,236	-	75,540,838
36	420,287,966	27,739,006	30,050,589	-	57,789,595
37	317,648,899	20,964,828	22,711,896	-	43,676,724
38	236,960,946	15,639,422	16,942,708	-	32,582,130
39	174,569,367	11,521,578	12,481,710	-	24,003,288
40	127,507,427	8,415,490	9,116,781	-	17,532,271
41	92,389,264	6,097,692	6,605,832	-	12,703,524
42	66,398,921	4,382,329	4,747,523	-	9,129,852
43	47,485,713	3,134,057	3,395,229	-	6,529,286
44	33,799,979	2,230,799	2,416,698	-	4,647,497
45	23,850,936	1,574,162	1,705,342	-	3,279,504
46	16,652,372	1,099,056	1,190,645	-	2,289,701
47	11,372,356	750,576	813,123	-	1,563,699
48	7,480,214	493,694	534,835	-	1,028,529
49	4,674,858	308,541	334,252	-	642,793
50	2,658,101	175,435	190,054	-	365,489



# Single Discount Rate Development

## Projection of Contributions Ending December 31, 2118

### (Concluded)

Year	Payroll for Current Employees	Contributions from Current Employees	Normal Cost Contributions	UAL Contributions	Total Contributions
51	\$ 1,308,327	\$ 86,350	\$ 93,545	\$ -	\$ 179,895
52	558,476	36,859	39,931	-	76,790
53	230,632	15,222	16,490	-	31,712
54	97,521	6,436	6,973	-	13,409
55	30,465	2,011	2,178	-	4,189
56	4,844	320	346	-	666
57	91	6	6	-	12
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, 2118

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	\$ 96,737,081,255	\$ 1,804,259,285	\$ 5,526,270,646	\$ 6,643,528,560	\$ 99,658,598,454
2	99,658,598,454	1,826,315,277	5,644,980,028	6,844,709,110	102,684,642,813
3	102,684,642,813	1,783,377,945	5,809,219,258	7,049,403,675	105,708,205,174
4	105,708,205,174	1,740,412,512	5,991,118,170	7,253,315,898	108,710,815,414
5	108,710,815,414	1,743,986,437	6,144,526,704	7,458,343,099	111,768,618,247
6	111,768,618,247	1,687,912,662	6,394,075,753	7,661,873,414	114,724,328,570
7	114,724,328,570	1,631,813,870	6,664,501,508	7,857,538,066	117,549,178,998
8	117,549,178,998	1,575,676,378	6,935,664,967	8,044,015,811	120,233,206,219
9	120,233,206,219	1,519,640,874	7,206,907,802	8,220,636,709	122,766,576,000
10	122,766,576,000	1,463,370,187	7,489,089,918	8,386,327,095	125,127,183,364
11	125,127,183,364	1,406,444,099	7,772,071,173	8,539,874,064	127,301,430,354
12	127,301,430,354	1,348,803,062	8,047,713,215	8,680,603,734	129,283,123,935
13	129,283,123,935	1,290,494,960	8,313,353,880	8,808,175,842	131,068,440,857
14	131,068,440,857	1,231,325,153	8,570,872,445	8,922,251,399	132,651,144,964
15	132,651,144,964	1,171,488,276	8,826,553,925	9,022,184,317	134,018,263,632
16	134,018,263,632	1,111,130,129	9,077,801,271	9,107,160,889	135,158,753,379
17	135,158,753,379	1,049,952,077	9,321,712,563	9,176,497,644	136,063,490,536
18	136,063,490,536	988,099,047	9,556,096,171	9,229,636,322	136,725,129,734
19	136,725,129,734	925,824,542	9,774,295,431	9,266,300,512	137,142,959,357
20	137,142,959,357	863,331,817	9,976,317,742	9,286,447,141	137,316,420,573
21	137,316,420,573	800,922,866	10,168,123,162	9,289,842,407	137,239,062,683
22	137,239,062,683	738,914,372	10,347,796,737	9,276,111,548	136,906,291,866
23	136,906,291,866	677,328,066	10,511,609,466	9,245,062,051	136,317,072,516
24	136,317,072,516	615,922,690	10,664,334,672	9,196,448,882	135,465,109,416
25	135,465,109,416	554,454,939	10,807,257,100	9,129,778,799	134,342,086,054
26	134,342,086,054	492,930,350	10,939,856,231	9,044,487,746	132,939,647,919
27	132,939,647,919	431,943,878	11,061,223,583	8,940,042,638	131,250,410,851
28	131,250,410,851	342,341,321	11,168,844,010	8,815,009,987	129,238,918,149
29	129,238,918,149	289,427,078	11,259,874,992	8,669,252,624	126,937,722,859
30	126,937,722,859	240,296,640	11,325,752,443	8,504,211,757	124,356,478,813
31	124,356,478,813	196,280,372	11,362,651,376	8,320,740,540	121,510,848,349
32	121,510,848,349	157,734,449	11,370,187,487	8,119,960,815	118,418,356,126
33	118,418,356,126	124,911,437	11,343,925,341	7,903,260,613	115,102,602,835
34	115,102,602,835	97,663,729	11,284,593,391	7,672,261,838	111,587,935,011
35	111,587,935,011	75,540,838	11,195,127,359	7,428,552,237	107,896,900,727
36	107,896,900,727	57,789,595	11,076,257,054	7,173,659,146	104,052,092,413
37	104,052,092,413	43,676,724	10,930,078,587	6,909,066,682	100,074,757,233
38	100,074,757,233	32,582,130	10,757,186,409	6,636,220,358	95,986,373,312
39	95,986,373,312	24,003,288	10,557,303,204	6,356,615,892	91,809,689,288
40	91,809,689,288	17,532,271	10,331,227,358	6,071,804,183	87,567,798,384
41	87,567,798,384	12,703,524	10,079,625,747	5,783,362,791	83,284,238,953
42	83,284,238,953	9,129,852	9,801,733,535	5,492,952,395	78,984,587,665
43	78,984,587,665	6,529,286	9,500,635,440	5,202,247,521	74,692,729,032
44	74,692,729,032	4,647,497	9,183,509,203	4,912,664,361	70,426,531,688
45	70,426,531,688	3,279,504	8,854,618,235	4,625,299,972	66,200,492,930
46	66,200,492,930	2,289,701	8,515,288,625	4,341,118,870	62,028,612,875
47	62,028,612,875	1,563,699	8,167,195,715	4,061,039,481	57,924,020,341
48	57,924,020,341	1,028,529	7,811,879,804	3,785,925,315	53,899,094,381
49	53,899,094,381	642,793	7,450,483,532	3,516,602,164	49,965,855,805
50	49,965,855,805	365,489	7,084,204,103	3,253,868,881	46,135,886,072

# Single Discount Rate Development Projection of Plan Fiduciary Net Position Ending December 31, 2118 (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	\$ 46,135,886,072	\$ 179,895	\$ 6,714,089,929	\$ 2,998,499,518	\$ 42,420,475,556
52	42,420,475,556	76,790	6,341,125,988	2,751,250,194	38,830,676,551
53	38,830,676,551	31,712	5,966,509,044	2,512,852,548	35,377,051,767
54	35,377,051,767	13,409	5,591,626,054	2,283,997,174	32,069,436,296
55	32,069,436,296	4,189	5,217,852,929	2,065,324,575	28,916,912,131
56	28,916,912,131	666	4,846,564,034	1,857,423,087	25,927,771,851
57	25,927,771,851	12	4,479,304,161	1,660,819,939	23,109,287,640
58	23,109,287,640	-	4,117,780,261	1,475,965,373	20,467,472,753
59	20,467,472,753	-	3,763,803,273	1,303,217,987	18,006,887,467
60	18,006,887,467	-	3,419,233,470	1,142,832,989	15,730,486,986
61	15,730,486,986	-	3,085,951,931	994,952,521	13,639,487,577
62	13,639,487,577	-	2,765,797,715	859,598,443	11,733,288,305
63	11,733,288,305	-	2,460,474,424	736,670,071	10,009,483,952
64	10,009,483,952	-	2,171,514,622	625,946,308	8,463,915,638
65	8,463,915,638	-	1,900,238,788	527,090,596	7,090,767,446
66	7,090,767,446	-	1,647,701,548	439,659,535	5,882,725,433
67	5,882,725,433	-	1,414,708,175	363,113,440	4,831,130,698
68	4,831,130,698	-	1,201,855,302	296,825,660	3,926,101,056
69	3,926,101,056	-	1,009,527,152	240,091,220	3,156,665,123
70	3,156,665,123	-	837,884,206	192,136,603	2,510,917,520
71	2,510,917,520	-	686,833,162	152,131,641	1,976,216,000
72	1,976,216,000	-	555,946,919	119,206,074	1,539,475,155
73	1,539,475,155	-	444,404,330	92,472,177	1,187,543,002
74	1,187,543,002	-	350,970,309	71,051,809	907,624,502
75	907,624,502	-	274,006,088	54,105,702	687,724,115
76	687,724,115	-	211,579,017	40,860,668	517,005,767
77	517,005,767	-	161,646,559	30,628,462	385,987,670
78	385,987,670	-	122,213,517	22,814,009	286,588,161
79	286,588,161	-	91,433,938	16,915,108	212,069,332
80	212,069,332	-	67,674,482	12,516,307	156,911,157
81	156,911,157	-	49,534,933	9,279,381	116,655,605
82	116,655,605	-	35,837,434	6,932,796	87,750,968
83	87,750,968	-	25,609,418	5,261,398	67,402,948
84	67,402,948	-	18,059,448	4,096,816	53,440,315
85	53,440,315	-	12,554,534	3,308,845	44,194,626
86	44,194,626	-	8,593,467	2,797,939	38,399,099
87	38,399,099	-	5,784,236	2,488,913	35,103,776
88	35,103,776	-	3,825,713	2,325,629	33,603,692
89	33,603,692	-	2,484,187	2,266,782	33,386,288
90	33,386,288	-	1,581,051	2,282,639	34,087,876
91	34,087,876	-	984,099	2,352,290	35,456,067
92	35,456,067	-	596,295	2,461,407	37,321,179
93	37,321,179	-	348,821	2,600,480	39,572,839
94	39,572,839	-	194,439	2,763,408	42,141,808
95	42,141,808	-	100,772	2,946,459	44,987,496
96	44,987,496	-	46,745	3,147,516	48,088,267
97	48,088,267	-	19,428	3,365,510	51,434,348
98	51,434,348	-	7,937	3,600,131	55,026,543
99	55,026,543	-	4,137	3,851,716	58,874,122
100	58,874,122	-	-	4,121,189	62,995,311

# Single Discount Rate Development

## Present Values of Projected Benefits Ending December 31, 2118

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	\$ 96,737,081,255	\$ 5,526,270,646	\$ 5,526,270,646	\$ -	\$ 5,342,447,482	\$ -	\$ 5,342,447,482
2	99,658,598,454	5,644,980,028	5,644,980,028	-	5,100,194,554	-	5,100,194,554
3	102,684,642,813	5,809,219,258	5,809,219,258	-	4,905,218,124	-	4,905,218,124
4	105,708,205,174	5,991,118,170	5,991,118,170	-	4,727,860,610	-	4,727,860,610
5	108,710,815,414	6,144,526,704	6,144,526,704	-	4,531,702,971	-	4,531,702,971
6	111,768,618,247	6,394,075,753	6,394,075,753	-	4,407,243,033	-	4,407,243,033
7	114,724,328,570	6,664,501,508	6,664,501,508	-	4,293,120,867	-	4,293,120,867
8	117,549,178,998	6,935,664,967	6,935,664,967	-	4,175,512,358	-	4,175,512,358
9	120,233,206,219	7,206,907,802	7,206,907,802	-	4,054,962,627	-	4,054,962,627
10	122,766,576,000	7,489,089,918	7,489,089,918	-	3,938,067,510	-	3,938,067,510
11	125,127,183,364	7,772,071,173	7,772,071,173	-	3,819,505,179	-	3,819,505,179
12	127,301,430,354	8,047,713,215	8,047,713,215	-	3,696,230,516	-	3,696,230,516
13	129,283,123,935	8,313,353,880	8,313,353,880	-	3,568,445,323	-	3,568,445,323
14	131,068,440,857	8,570,872,445	8,570,872,445	-	3,438,302,105	-	3,438,302,105
15	132,651,144,964	8,826,553,925	8,826,553,925	-	3,309,225,806	-	3,309,225,806
16	134,018,263,632	9,077,801,271	9,077,801,271	-	3,180,768,904	-	3,180,768,904
17	135,158,753,379	9,321,712,563	9,321,712,563	-	3,052,554,141	-	3,052,554,141
18	136,063,490,536	9,556,096,171	9,556,096,171	-	2,924,586,038	-	2,924,586,038
19	136,725,129,734	9,774,295,431	9,774,295,431	-	2,795,667,865	-	2,795,667,865
20	137,142,959,357	9,976,317,742	9,976,317,742	-	2,666,776,430	-	2,666,776,430
21	137,316,420,573	10,168,123,162	10,168,123,162	-	2,540,231,841	-	2,540,231,841
22	137,239,062,683	10,347,796,737	10,347,796,737	-	2,415,998,548	-	2,415,998,548
23	136,906,291,866	10,511,609,466	10,511,609,466	-	2,293,687,350	-	2,293,687,350
24	136,317,072,516	10,664,334,672	10,664,334,672	-	2,174,778,296	-	2,174,778,296
25	135,465,109,416	10,807,257,100	10,807,257,100	-	2,059,742,499	-	2,059,742,499
26	134,342,086,054	10,939,856,231	10,939,856,231	-	1,948,611,601	-	1,948,611,601
27	132,939,647,919	11,061,223,583	11,061,223,583	-	1,841,336,077	-	1,841,336,077
28	131,250,410,851	11,168,844,010	11,168,844,010	-	1,737,618,129	-	1,737,618,129
29	129,238,918,149	11,259,874,992	11,259,874,992	-	1,637,178,018	-	1,637,178,018
30	126,937,722,859	11,325,752,443	11,325,752,443	-	1,539,024,817	-	1,539,024,817
31	124,356,478,813	11,362,651,376	11,362,651,376	-	1,443,027,018	-	1,443,027,018
32	121,510,848,349	11,370,187,487	11,370,187,487	-	1,349,517,836	-	1,349,517,836
33	118,418,356,126	11,343,925,341	11,343,925,341	-	1,258,318,509	-	1,258,318,509
34	115,102,602,835	11,284,593,391	11,284,593,391	-	1,169,847,800	-	1,169,847,800
35	111,587,935,011	11,195,127,359	11,195,127,359	-	1,084,647,722	-	1,084,647,722
36	107,896,900,727	11,076,257,054	11,076,257,054	-	1,002,926,065	-	1,002,926,065
37	104,052,092,413	10,930,078,587	10,930,078,587	-	924,943,914	-	924,943,914
38	100,074,757,233	10,757,186,409	10,757,186,409	-	850,759,939	-	850,759,939
39	95,986,373,312	10,557,303,204	10,557,303,204	-	780,328,652	-	780,328,652
40	91,809,689,288	10,331,227,358	10,331,227,358	-	713,662,210	-	713,662,210
41	87,567,798,384	10,079,625,747	10,079,625,747	-	650,730,872	-	650,730,872
42	83,284,238,953	9,801,733,535	9,801,733,535	-	591,392,916	-	591,392,916
43	78,984,587,665	9,500,635,440	9,500,635,440	-	535,725,232	-	535,725,232
44	74,692,729,032	9,183,509,203	9,183,509,203	-	483,965,425	-	483,965,425
45	70,426,531,688	8,854,618,235	8,854,618,235	-	436,105,671	-	436,105,671
46	66,200,492,930	8,515,288,625	8,515,288,625	-	391,956,155	-	391,956,155
47	62,028,612,875	8,167,195,715	8,167,195,715	-	351,339,760	-	351,339,760
48	57,924,020,341	7,811,879,804	7,811,879,804	-	314,069,753	-	314,069,753
49	53,899,094,381	7,450,483,532	7,450,483,532	-	279,944,050	-	279,944,050
50	49,965,855,805	7,084,204,103	7,084,204,103	-	248,767,745	-	248,767,745

# Single Discount Rate Development

## Present Values of Projected Benefits Ending December 31, 2118 (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	\$ 46,135,886,072	\$ 6,714,089,929	\$ 6,714,089,929	\$ -	\$ 220,346,614	\$ -	\$ 220,346,614
52	42,420,475,556	6,341,125,988	6,341,125,988	-	194,492,040	-	194,492,040
53	38,830,676,551	5,966,509,044	5,966,509,044	-	171,029,874	-	171,029,874
54	35,377,051,767	5,591,626,054	5,591,626,054	-	149,798,000	-	149,798,000
55	32,069,436,296	5,217,852,929	5,217,852,929	-	130,639,933	-	130,639,933
56	28,916,912,131	4,846,564,034	4,846,564,034	-	113,405,546	-	113,405,546
57	25,927,771,851	4,479,304,161	4,479,304,161	-	97,955,114	-	97,955,114
58	23,109,287,640	4,117,780,261	4,117,780,261	-	84,158,106	-	84,158,106
59	20,467,472,753	3,763,803,273	3,763,803,273	-	71,891,231	-	71,891,231
60	18,006,887,467	3,419,233,470	3,419,233,470	-	61,037,113	-	61,037,113
61	15,730,486,986	3,085,951,931	3,085,951,931	-	51,483,801	-	51,483,801
62	13,639,487,577	2,765,797,715	2,765,797,715	-	43,123,906	-	43,123,906
63	11,733,288,305	2,460,474,424	2,460,474,424	-	35,853,598	-	35,853,598
64	10,009,483,952	2,171,514,622	2,171,514,622	-	29,572,829	-	29,572,829
65	8,463,915,638	1,900,238,788	1,900,238,788	-	24,185,469	-	24,185,469
66	7,090,767,446	1,647,701,548	1,647,701,548	-	19,599,325	-	19,599,325
67	5,882,725,433	1,414,708,175	1,414,708,175	-	15,726,991	-	15,726,991
68	4,831,130,698	1,201,855,302	1,201,855,302	-	12,486,686	-	12,486,686
69	3,926,101,056	1,009,527,152	1,009,527,152	-	9,802,328	-	9,802,328
70	3,156,665,123	837,884,206	837,884,206	-	7,603,463	-	7,603,463
71	2,510,917,520	686,833,162	686,833,162	-	5,824,987	-	5,824,987
72	1,976,216,000	555,946,919	555,946,919	-	4,406,494	-	4,406,494
73	1,539,475,155	444,404,330	444,404,330	-	3,291,959	-	3,291,959
74	1,187,543,002	350,970,309	350,970,309	-	2,429,756	-	2,429,756
75	907,624,502	274,006,088	274,006,088	-	1,772,837	-	1,772,837
76	687,724,115	211,579,017	211,579,017	-	1,279,374	-	1,279,374
77	517,005,767	161,646,559	161,646,559	-	913,498	-	913,498
78	385,987,670	122,213,517	122,213,517	-	645,471	-	645,471
79	286,588,161	91,433,938	91,433,938	-	451,316	-	451,316
80	212,069,332	67,674,482	67,674,482	-	312,187	-	312,187
81	156,911,157	49,534,933	49,534,933	-	213,559	-	213,559
82	116,655,605	35,837,434	35,837,434	-	144,397	-	144,397
83	87,750,968	25,609,418	25,609,418	-	96,436	-	96,436
84	67,402,948	18,059,448	18,059,448	-	63,556	-	63,556
85	53,440,315	12,554,534	12,554,534	-	41,293	-	41,293
86	44,194,626	8,593,467	8,593,467	-	26,415	-	26,415
87	38,399,099	5,784,236	5,784,236	-	16,617	-	16,617
88	35,103,776	3,825,713	3,825,713	-	10,271	-	10,271
89	33,603,692	2,484,187	2,484,187	-	6,233	-	6,233
90	33,386,288	1,581,051	1,581,051	-	3,708	-	3,708
91	34,087,876	984,099	984,099	-	2,157	-	2,157
92	35,456,067	596,295	596,295	-	1,221	-	1,221
93	37,321,179	348,821	348,821	-	668	-	668
94	39,572,839	194,439	194,439	-	348	-	348
95	42,141,808	100,772	100,772	-	168	-	168
96	44,987,496	46,745	46,745	-	73	-	73
97	48,088,267	19,428	19,428	-	28	-	28
98	51,434,348	7,937	7,937	-	11	-	11
99	58,878,259	4,137	4,137	-	5	-	5
100	58,874,122	-	-	-	-	-	-
<b>Totals</b>					\$ 114,544,723,872	\$ -	\$ 114,544,723,872

**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:

2018: 2.4% Core, 17.0% Variable  
2019: 0.0% Core, -10.0% Variable  
2020: 0.0% Core, 1.9% Variable  
2021: 0.8% Core, 1.9% Variable  
2022: 0.9% Core, 1.9% Variable  
2023: 0.0% Core, 1.9% Variable  
2024 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.

The **Price Inflation** assumption is not required to perform this valuation, since there are no benefits that are linked to price increases. However, a price inflation assumption of 2.5% would be consistent with the other economic assumptions.

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 both an inflation assumption and an average expense provision.

**Pay increase assumptions** for individual active members are shown for sample services below. Part of the assumption for each age is for merit and/or seniority increase, and the other 3.0% recognizes wage inflation, including price inflation, productivity increases, and other macro-economic forces.

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



## Decrement Probabilities

The mortality table used to measure mortality for retired participants was the Wisconsin 2018 Mortality Table. The rates in this table were based on actual WRS experience with a base year of 2017 and adjusted for future mortality improvements using the MP-2018 fully generational improvement scale (multiplied by 60%). The mortality table was adopted by the Board in connection with the 2015-2017 Experience Study. 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 (without projection)

Sample Attained Ages in 2017	Present Value of \$1 Monthly for Life		Future Life Expectancy (years)	
	Males	Females	Males	Females
40	\$212.83	\$217.51	45.2	48.1
45	204.47	210.12	40.2	43.0
50	193.94	200.93	35.2	38.0
55	181.25	189.74	30.3	33.1
60	167.00	176.48	25.7	28.3
65	150.02	160.47	21.2	23.6
70	130.75	141.40	17.0	19.1
75	109.21	119.70	13.1	14.9
80	86.46	96.36	9.6	11.1
85	65.10	73.24	6.8	7.8

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

Sample Attained Ages in 2017	Present Value of \$1 Monthly for Life		Future Life Expectancy (years)	
	Males	Females	Males	Females
40	\$199.39	\$207.67	37.6	41.7
45	187.70	197.93	32.7	36.6
50	174.16	186.09	27.9	31.7
55	158.36	171.97	23.4	26.9
60	139.90	155.13	19.0	22.3
65	119.59	135.45	15.0	17.9
70	97.56	113.35	11.3	13.8
75	75.33	89.84	8.1	10.1
80	55.72	67.30	5.6	7.1
85	39.78	49.22	3.8	4.9

## Active Participant Mortality Rates

Sample Attained Ages in 2017	Mortality Rates	
	Males	Females
20	0.000134	0.000080
25	0.000163	0.000089
30	0.000208	0.000121
35	0.000364	0.000216
40	0.000482	0.000301
45	0.000615	0.000459
50	0.000814	0.000673
55	0.001895	0.001207
60	0.002718	0.001747
65	0.00415	0.002631
70	0.006771	0.004408
75	0.011435	0.007994
80	0.021013	0.015010

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		Public School		University		Protective*		Exec. & Elected
	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%	33%	27%	12%	15%	20%	25%	8%
58	19%	17%	29%	27%	12%	15%	20%	33%	8%
59	19%	17%	24%	27%	12%	10%	20%	33%	8%
60	19%	17%	25%	27%	12%	12%	20%	20%	20%
61	19%	17%	25%	27%	12%	16%	20%	20%	12%
62	26%	27%	35%	37%	12%	15%	30%	40%	12%
63	29%	27%	32%	30%	12%	20%	30%	40%	12%
64	28%	27%	29%	28%	12%	20%	30%	111%	15%
65	30%	30%	29%	37%	15%	20%	40%	40%	15%
66	35%	35%	35%	39%	20%	24%	40%	100%	15%
67	30%	30%	33%	33%	20%	20%	40%	100%	15%
68	19%	25%	27%	30%	18%	17%	40%	100%	15%
69	19%	25%	23%	28%	16%	17%	40%	100%	20%
70	19%	25%	25%	38%	20%	18%	100%	100%	20%
71	19%	20%	20%	20%	18%	18%	100%	100%	20%
72	19%	20%	15%	20%	16%	18%	100%	100%	20%
73	19%	20%	15%	20%	16%	15%	100%	100%	20%
74	19%	20%	15%	20%	16%	15%	100%	100%	20%
75	100%	100%	100%	100%	100%	100%	100%	100%	100%

\* Includes early retirements.

### Early Retirement

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

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

### Disability Rates

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

## **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		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.

**Early Retirement.** Any participant who has attained age 55 and any Protective occupation participant who has attained age 50 may apply for an early 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%.

**Disability Annuity.** Eligibility: generally total and permanent incapacity to engage in gainful employment. Participant must have completed at least 6 months of creditable service (in at least 5 out of the last 7 calendar years) preceding application for disability. Service requirement is waived if disability is from service-related causes.

For protective occupations, eligibility also can be met if a member has 15 years of service, is between the ages of 50 and 55 and unable to safely and efficiently perform one’s duties.

**Disability Amounts.** Amounts payable in case of disability depend upon the plan from which payment is made and are described below.

	<b>Pre-10/16/92 WRS Plan</b>	<b>Post-10/15/92 LTDI Plan</b>
<b>Participants covered</b>	Participants hired before 10/16/92 who do not elect LTDI coverage.	Participants entering after 10/15/92 and participants on 10/15/92 who elect LTDI coverage.
<b>Benefit to age 65*</b>	WRS formula benefit based on service projected to normal retirement age.	40% of FAE for participants covered by Social Security; 50% of FAE for non-covered participants who cannot qualify for Social Security disability benefits.
<b>Benefit at age 65*</b>	Continuation of pre-65 amount.	WRS benefit accrued to date of disability plus 7% of FAE money purchase benefit during disability period, both of which are adjusted in accordance with dividend rate.

\* Conversion age is later for participants becoming disabled after age 61. The Post-1992 LTD plan was closed to new disabilities effective January 1, 2018. The Pre-1992 plan was reinstated for all new disabilities after that point.

**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:

<b>Date of Participation</b>	<b>Rate Credited for Purpose of</b>	
	<b>Money Purchase</b>	<b>Refunds</b>
	<b>Minimum</b>	
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	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.