

# Wisconsin Retirement System

GASB Statement No. 67 Plan Reporting and  
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, WI 53705-9100

This report provides certain information requested by the Wisconsin Retirement System (“WRS”) in connection with the Governmental Accounting Standards Board (GASB) Statement No. 67 “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. 67. These calculations have been made on a basis that is consistent with our understanding of this Statement.

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. 67 may produce significantly different results. This report may be provided to parties other than the WRS only in its entirety and only with the permission of the WRS. GRS is not responsible for unauthorized use of this report.

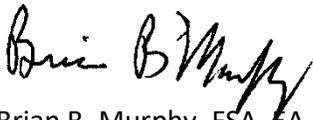
The report was based upon information, furnished by the Department of Employee Trust Funds (DETF), concerning Retirement System benefits, financial transactions, and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not audit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

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

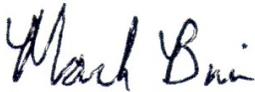
This report is intended to assist in preparation of the financial statements of WRS and its participating employers. Financial statements are the responsibility of the reporting entity and not the actuary. The statements are subject to an auditor’s review. Please let us know if the plan’s auditor recommends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

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



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## **SECTION A**

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### **EXECUTIVE SUMMARY**

# Executive Summary as of December 31, 2019

	<b>2019</b>
Actuarial Valuation Date	December 31, 2019
Pension Plan's Fiscal Year Ending Date (Measurement Date & Reporting Date)	December 31, 2019
 <b>Membership</b>	
Number of	
- Retirees and Beneficiaries	216,944
- Inactive, Nonretired Members	169,471
- Active Members	259,234
- Total	645,649
Covered Payroll <sup>(1)</sup>	\$ 14,832,491,878
 <b>Net Pension Liability/(Asset)</b>	
Total Pension Liability	\$ 109,892,062,138
Plan Fiduciary Net Position	112,092,758,422
Net Pension Liability/(Asset)	\$ (2,200,696,284)
Plan Fiduciary Net Position as a Percentage of Total Pension Liability/(Asset)	102.00%
Net Pension Liability/(Asset) as a Percentage of Covered Payroll	-14.84%
 <b>Development of the Single Discount Rate</b>	
Single Discount Rate	7.00%
Long-Term Expected Rate of 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

<sup>(1)</sup> Covered Payroll 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 pension plans that are administered through trusts or equivalent arrangements, Governmental Accounting Standards Board (GASB) Statement No. 67, “Financial Reporting for Pension Plans,” replaces the requirements of GASB Statement No. 25, “Financial Reporting for Defined Benefit Pension Plans and Note Disclosures for Defined Contribution Plans,” and GASB Statement No. 50, “Pension Disclosures.” GASB Statement No. 67 establishes standards of financial reporting for separately issued financial reports and specifies the required approach for measuring the pension liability of employers and non-employer contributing entities for benefits provided through the pension plan.

The following discussion provides a summary of the information that is required to be disclosed under this accounting standard. A number of these disclosure items are provided in this report. However, certain information, such as notes regarding accounting policies and investments, is not included in this report, and your internal staff will be responsible for preparing that information to comply with this accounting standard.

## Financial Statements

GASB Statement No. 67 requires defined benefit pension plans to present two financial statements – a statement of fiduciary net position and a statement of changes in fiduciary net position.

The *statement of fiduciary net position* presents the following items as of the end of the pension plan’s reporting period, such as:

- assets;
- deferred inflows and outflows of resources;
- liabilities; and
- fiduciary net position (assets, plus deferred outflows, minus liabilities, minus deferred inflows).

The *statement of changes in fiduciary net position* presents the following for the plan’s reporting period:

- additions, such as contributions and investment income;
- deductions, such as benefit payments and expenses; and
- net increase or decrease in the fiduciary net position (the difference between additions and deductions).

## Notes to Financial Statements

GASB Statement No. 67 also requires the notes of the plan's financial statements to include additional disclosure information. This disclosure information should include:

- 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;
- the composition of the pension plan's Board and the authority under which benefit terms may be amended;
- a description of the plan's funding policy, which includes member and employer contribution requirements;
- the pension plan's investment policies;
- a description of how fair value is determined;
- concentrations of investments greater than or equal to 5%;
- annual money-weighted rate of return on pension plan investments;
- the portion of the present value of benefits to be provided through the pension plan to current active and inactive plan members;
- the pension plan's fiduciary net position;
- the net pension liability/(asset);
- the pension plan's fiduciary net position as a percentage of the total pension liability;
- significant assumptions and methods used to calculate the total pension liability;
- inputs to the discount rates; and
- certain information about mortality assumptions and the dates of experience studies.

### Required Supplementary Information

GASB Statement No. 67 requires a 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;
- comparison of the actual employer contributions to the actuarially determined contributions based on the plan's funding policy; and
- the annual money-weighted rate of return on pension plan investments for each year.

These tables may be built prospectively.

### Measurement of the Net Pension Liability/(Asset)

The net pension liability/(asset) is to be measured as the total pension liability, less the amount of the pension plan's fiduciary net position. In actuarial terms, this will be 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).

## 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 7.0% 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. If the actuarial valuation is not calculated as of the plan's fiscal year end, the total pension liability is required to be rolled forward from the actuarial valuation date to the pension plan's fiscal year end.

The total pension liability shown in this report is based on an actuarial valuation performed as of December 31, 2019 and a measurement date of December 31, 2019.

## 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 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% (based on the weekly 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, 2019 actuarial valuation Report of the Wisconsin Retirement System. Therefore, the actuarial assumptions and methods employed for purposes of our Actuarial Study are the same actuarial assumptions and methods shown in the actuarial valuation report.

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

The Wisconsin Retirement System uses the Frozen Entry Age cost method for determining funding requirements. GASB Statement No. 67 requires the use of the Entry Age Normal 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**

## Statement of Fiduciary Net Position as of December 31, 2019

	<b>2019</b>
<b>Assets</b>	
Cash and Deposits	\$ 5,171,632,998
Receivables	
Accounts Receivable - Sale of Investments	\$ 6,490,810,634
Accrued Interest and Other Dividends	386,661,695
Contributions	158,712,481
Accounts Receivable - Other	10,002,892
Total Receivables	\$ 7,046,187,702
Investments	
Fixed Income	\$ 36,427,253,465
Domestic and International Equities	66,011,289,706
Real Estate	1,374,070,311
Other	21,523,106,589
Total Investments	\$ 125,335,720,071
<b>Total Assets</b>	<b>\$ 137,553,540,771</b>
 <b>Liabilities</b>	
Payables	
Accounts Payable - Purchase of Investments	\$ 24,924,126,321
Accrued Expenses	7,671,305
Accounts Payable - Other	528,984,723
Total Liabilities	\$ 25,460,782,349
 <b>Net Position Restricted for Pensions</b>	 <b>\$ 112,092,758,422</b>

## Statement of Changes in Fiduciary Net Position for Year Ended December 31, 2019

	<b>2019</b>
<b>Additions</b>	
Contributions	
Employer	\$ 1,046,942,283
Employee	987,662,027
Other	-
<b>Total Contributions</b>	<b>\$ 2,034,604,310</b>
Investment Income	
Net Appreciation in Fair Value of Investments	\$ 17,744,063,568
Interest and Dividends	2,154,199,130
Less Investment Expense	(848,720,766)
<b>Net Investment Income</b>	<b>\$ 19,049,541,932</b>
Other	\$ -
<b>Total Additions</b>	<b>\$ 21,084,146,242</b>
 <b>Deductions</b>	
Benefit payments, including refunds of employee contributions	\$ 5,690,369,699
Pension Plan Administrative Expense	34,197,722
Other Benefit Expenses	3,901,654
<b>Total Deductions</b>	<b>\$ 5,728,469,075</b>
<b>Net Increase in Net Position</b>	<b>\$ 15,355,677,167</b>
 <b>Net Position Restricted for Pensions</b>	
Beginning of Year	\$ 96,737,081,255
End of Year	<b>\$ 112,092,758,422</b>

## **SECTION C**

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### **REQUIRED SUPPLEMENTARY INFORMATION**

# Schedules of Required Supplementary Information

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

### 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	6,846,131,206	7,194,603,494	6,604,529,732	6,363,034,249	6,349,703,745	6,089,287,273	5,680,664,977			
Benefit Changes	-	-	-	-	-	-	-			
Experience <sup>(1)</sup>	7,137,987,427	(5,980,346,708)	5,142,055,157	318,473,379	(4,488,825,613)	473,101,546	2,659,920,220			
Assumption Changes	-	404,242,989	-	-	1,484,977,863	-	-			
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>10,196,256,911</b>	<b>(2,076,986,386)</b>	<b>8,339,839,123</b>	<b>3,433,445,998</b>	<b>272,497,394</b>	<b>3,744,760,674</b>	<b>5,827,662,298</b>			
<b>Total Pension Liability - Beginning</b>	<b>99,695,805,227</b>	<b>101,772,791,613</b>	<b>93,432,952,490</b>	<b>89,999,506,492</b>	<b>89,727,009,098</b>	<b>85,982,248,424</b>	<b>80,154,586,126</b>			
<b>Total Pension Liability - Ending (a)<sup>(2)</sup></b>	<b>\$ 109,892,062,138</b>	<b>\$ 99,695,805,227</b>	<b>\$ 101,772,791,613</b>	<b>\$ 93,432,952,490</b>	<b>\$ 89,999,506,492</b>	<b>\$ 89,727,009,098</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>(2,200,696,284)</b>	<b>2,958,723,972</b>	<b>(2,623,670,714)</b>	<b>852,849,995</b>	<b>1,494,836,183</b>	<b>(2,419,762,449)</b>	<b>(3,942,498,202)</b>			
<b>Plan Fiduciary Net Position as a Percentage of Total Pension Liability</b>	102.00 %	97.03 %	102.58 %	99.09 %	98.34 %	102.70 %	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>	(14.84)%	20.69 %	(18.82)%	6.22 %	11.05 %	(18.30)%	(30.60)%			

**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, end of year liabilities were adjusted to reflect the Long Term Disability Insurance (LTDI) program.

<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.



# Schedules of Required Supplementary Information

## Multiyear Schedule of the Net Pension Liability/(Asset)

### Last 10 Fiscal Years (which may be built prospectively)

FY Ending December 31,	Total Pension Liability	Plan Net Position	Net Pension Liability/(Asset)	Plan Net Position as a % of Total Pension Liability	Covered Payroll <sup>(1)</sup>	Net Pension Liability/(Asset) as a % of Covered Payroll
2010						
2011						
2012						
2013	\$ 85,982,248,424	\$ 89,924,746,626	\$ (3,942,498,202)	104.59%	\$ 12,884,800,000	(30.60)%
2014	89,727,009,098	92,146,771,547	(2,419,762,449)	102.70%	13,219,500,000	(18.30)%
2015	89,999,506,492	88,504,670,309	1,494,836,183	98.34%	13,530,500,000	11.05 %
2016	93,432,952,490	92,580,102,495	852,849,995	99.09%	13,706,000,000	6.22 %
2017	101,772,791,613	104,396,462,327	(2,623,670,714)	102.58%	13,943,116,649	(18.82)%
2018	99,695,805,227	96,737,081,255	2,958,723,972	97.03%	14,301,446,269	20.69 %
2019	109,892,062,138	112,092,758,422	(2,200,696,284)	102.00%	14,832,491,878	(14.84)%

<sup>(1)</sup> Covered payroll provided by DETF.

# Multiyear Schedule of Contributions

## Last 10 Fiscal Years (which may be built prospectively)

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

**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 Percentage of Payroll - Closed Amortization Period
Amortization Period	30-Year closed from date of participation in WRS
Asset Valuation Method	5-Year smoothed value
Inflation	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%.
Salary Increases	3.2% to 8.8% including inflation
Assumed Rates of Investment Return for:	
Retired participants	5.00%
Post-retirement active participants	5.00%
Pre-retirement active participants	7.20%
Weighted Average Investment Rate of Return	5.50%
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	Fully generational mortality utilizing the WRS 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 2019 was determined from the December 31, 2017 actuarial valuation.

# Multiyear Schedule of Investment Returns

## Last 10 Fiscal Years (which may be built prospectively)

<u>FY Ending December 31,</u>	<u>Core Annual Return<sup>1</sup></u>	<u>Variable Annual Return<sup>1</sup></u>
2010	11.92 %	15.23 %
2011	1.25 %	(3.02)%
2012	13.40 %	16.94 %
2013	13.18 %	28.78 %
2014	5.44 %	7.24 %
2015	(0.63)%	(1.11)%
2016	8.29 %	10.49 %
2017	15.85 %	23.27 %
2018	(3.56)%	(7.61)%
2019	19.49 %	28.80 %

<sup>1</sup> Annual money-weighted rate of return, net of investment expenses.

The money weighted rate of return expresses investment performance net of pension plan investment expense, adjusted for the changing amounts actually invested.

## **SECTION D**

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### **NOTES TO FINANCIAL STATEMENTS**

## Long-Term Expected Return on Plan Assets

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. The long-term expected rate of return is reviewed every three years in conjunction with the WRS experience study. For each major asset class that is included in the pension plan's target asset allocation as of December 31, 2019, these best estimates of geometric real rates of return were provided by DETF and are summarized in the following tables:

### Core Asset Allocation

<u>Asset Class</u>	<u>Target Allocation</u>	<u>Long-Term Expected Real Rate of Return</u>
Equities	49.00%	5.10%
Fixed Income	24.50%	2.10%
Inflation Sens. Assets	15.50%	1.20%
Real Estate	9.00%	3.50%
Private Equity/Debt	8.00%	7.60%
Multi-asset	4.00%	4.00%
Cash	-10.00%	0.90%
<b>Total</b>	<b>100.00%</b>	

### Variable Asset Allocation

<u>Asset Class</u>	<u>Target Allocation</u>	<u>Long-Term Expected Real Rate of Return</u>
Domestic Equity	70.00%	4.60%
International Equity	30.00%	5.30%
Fixed Income	N/A	N/A
Inflation Sens. Assets	N/A	N/A
Real Estate	N/A	N/A
Private Equity/Debt	N/A	N/A
Multi-asset	N/A	N/A
Cash	N/A	N/A
<b>Total</b>	<b>100.00%</b>	

## Single Discount Rate

A single discount rate of 7.00% was used to measure the total pension liability. This single discount rate was based on the expected rate of return on pension plan investments of 7.00% and a long-term bond rate of 2.75%. Because of the unique structure of WRS, the 7.00% expected rate of return implies that a dividend of approximately 1.9% will always be paid. 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

Discount Rate	Current Single Discount		
	1% Decrease	Rate Assumption	1% Increase
Ultimate Dividend Rate	<b>6.00%</b>	<b>7.00%</b>	<b>8.00%</b>
	<b>1.90%</b>	<b>1.90%</b>	<b>1.90%</b>
Total Pension Liability	\$ 121,545,173,008	\$ 109,892,062,138	\$ 101,172,161,803
Plan Fiduciary Net Position	112,092,758,422	112,092,758,422	112,092,758,422
Net Pension Liability/(Asset)	\$ 9,452,414,586	\$ (2,200,696,284)	\$ (10,920,596,619)

This schedule 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 1.00% for the 6.0% discount rate, 1.90% for the 7.0% discount rate, and 2.90% 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	\$ 114,574,025,807	\$ 109,892,062,138	\$ 106,347,893,571
Plan Fiduciary Net Position	112,092,758,422	112,092,758,422	112,092,758,422
Net Pension Liability/(Asset)	\$ 2,481,267,385	\$ (2,200,696,284)	\$ (5,744,864,851)

## Summary of Population Statistics

Inactive Plan Members or Beneficiaries Currently Receiving Benefits	216,944
Inactive Plan Members Entitled to But Not Yet Receiving Benefits	169,471
Active Plan Members	<u>259,234</u>
Total Plan Members	645,649

## **SECTION E**

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### **CALCULATION OF THE SINGLE DISCOUNT RATE**

## 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 single discount rate is 7.00%.

The tables in this section provide background for the development of the single discount rate.

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 valuations (14.10%). Expected contribution rates gradually decrease as the unrecognized asset gains 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, 2119

Year	Payroll for Current Employees	Contributions from Current Employees	Normal Cost Contributions	UAL Contributions	Total Contributions
0	\$ 14,583,748,530				
1	14,526,937,850	\$ 981,134,856	\$ 1,067,163,381	\$ -	\$ 2,048,298,237
2	14,040,187,859	941,534,998	1,024,091,302	-	1,965,626,300
3	13,609,236,238	886,560,085	964,296,043	-	1,850,856,128
4	13,197,565,448	834,455,668	907,622,971	-	1,742,078,639
5	12,795,442,717	809,030,252	879,968,187	-	1,688,998,439
6	12,399,021,787	754,269,692	820,406,075	-	1,574,675,767
7	12,007,666,290	730,462,364	794,511,255	-	1,524,973,619
8	11,620,769,224	706,926,254	768,911,437	-	1,475,837,691
9	11,236,831,697	683,570,183	743,507,443	-	1,427,077,626
10	10,854,431,684	660,307,643	718,205,181	-	1,378,512,824
11	10,471,302,075	637,000,719	692,854,645	-	1,329,855,364
12	10,083,494,469	613,409,219	667,194,579	-	1,280,603,798
13	9,687,783,535	589,336,936	641,011,573	-	1,230,348,509
14	9,285,195,653	564,846,307	614,373,541	-	1,179,219,848
15	8,876,897,503	540,008,306	587,357,677	-	1,127,365,983
16	8,460,680,786	514,688,594	559,817,866	-	1,074,506,460
17	8,037,160,542	488,924,587	531,794,802	-	1,020,719,389
18	7,607,302,938	462,775,060	503,352,413	-	966,127,473
19	7,171,918,966	436,289,347	474,544,362	-	910,833,709
20	6,732,883,974	409,581,531	445,494,734	-	855,076,265
21	6,292,379,299	382,784,310	416,347,861	-	799,132,171
22	5,850,939,324	355,930,192	387,139,102	-	743,069,294
23	5,406,608,915	328,900,240	357,739,092	-	686,639,332
24	4,957,065,164	301,553,145	327,994,131	-	629,547,276
25	4,502,132,392	273,878,220	297,892,594	-	571,770,814
26	4,045,959,068	246,127,828	267,708,974	-	513,836,802
27	3,593,267,878	218,589,265	237,755,756	-	456,345,021
28	3,147,682,397	207,314,232	225,492,098	-	432,806,330
29	2,713,876,077	178,742,663	194,415,298	-	373,157,961
30	2,298,070,333	151,356,657	164,628,014	-	315,984,671
31	1,911,961,902	125,926,591	136,968,170	-	262,894,761
32	1,565,283,723	103,093,499	112,133,013	-	215,226,512
33	1,260,252,396	83,003,373	90,281,331	-	173,284,704
34	999,338,256	65,818,916	71,590,094	-	137,409,010
35	782,619,126	51,545,252	56,064,878	-	107,610,130
36	606,524,740	39,947,236	43,449,916	-	83,397,152
37	464,905,352	30,619,829	33,304,657	-	63,924,486
38	351,791,245	23,169,851	25,201,445	-	48,371,296
39	263,019,774	17,323,140	18,842,079	-	36,165,219
40	194,588,350	12,816,075	13,939,823	-	26,755,898
41	142,526,183	9,387,131	10,210,219	-	19,597,350
42	103,411,641	6,810,949	7,408,152	-	14,219,101
43	74,353,445	4,897,104	5,326,495	-	10,223,599
44	53,070,512	3,495,356	3,801,839	-	7,297,195
45	37,872,368	2,494,369	2,713,082	-	5,207,451
46	26,846,290	1,768,164	1,923,201	-	3,691,365
47	18,727,696	1,233,453	1,341,605	-	2,575,058
48	12,864,287	847,274	921,566	-	1,768,840
49	8,504,338	560,117	609,229	-	1,169,346
50	5,294,911	348,736	379,314	-	728,050

# 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	\$ 3,043,500	\$ 200,452	\$ 218,029	\$ -	\$ 418,481
52	1,559,407	102,707	111,712	-	214,419
53	694,701	45,755	49,766	-	95,521
54	299,629	19,734	21,465	-	41,199
55	130,954	8,625	9,381	-	18,006
56	46,818	3,083	3,354	-	6,437
57	10,401	685	745	-	1,430
58	508	34	36	-	70
59	120	8	8	-	16
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	\$ 2,048,298,237	\$ 5,985,734,661	\$ 7,711,013,607	\$ 115,866,335,605
2	115,866,335,605	1,965,626,300	6,272,592,753	7,962,449,204	119,521,818,356
3	119,521,818,356	1,850,856,128	6,572,965,015	8,204,048,758	123,003,758,228
4	123,003,758,228	1,742,078,639	6,806,519,918	8,436,005,561	126,375,322,510
5	126,375,322,510	1,688,998,439	7,148,645,194	8,658,416,814	129,574,092,569
6	129,574,092,569	1,574,675,767	7,412,560,897	8,869,316,276	132,605,523,715
7	132,605,523,715	1,524,973,619	7,671,760,195	9,070,887,762	135,529,624,900
8	135,529,624,900	1,475,837,691	7,934,935,950	9,264,828,811	138,335,355,451
9	138,335,355,451	1,427,077,626	8,205,001,839	9,450,259,772	141,007,691,011
10	141,007,691,011	1,378,512,824	8,473,873,569	9,626,400,891	143,538,731,157
11	143,538,731,157	1,329,855,364	8,748,089,564	9,792,464,258	145,912,961,214
12	145,912,961,214	1,280,603,798	9,018,552,708	9,947,659,604	148,122,671,909
13	148,122,671,909	1,230,348,509	9,282,470,431	10,091,529,274	150,162,079,261
14	150,162,079,261	1,179,219,848	9,537,377,470	10,223,757,699	152,027,679,338
15	152,027,679,338	1,127,365,983	9,782,559,123	10,344,129,293	153,716,615,491
16	153,716,615,491	1,074,506,460	10,027,704,292	10,452,101,066	155,215,518,725
17	155,215,518,725	1,020,719,389	10,268,832,471	10,546,876,836	156,514,282,478
18	156,514,282,478	966,127,473	10,494,864,035	10,628,134,593	157,613,680,509
19	157,613,680,509	910,833,709	10,705,448,052	10,695,944,121	158,515,010,287
20	158,515,010,287	855,076,265	10,906,222,834	10,750,210,434	159,214,074,152
21	159,214,074,152	799,132,171	11,096,738,400	10,790,664,710	159,707,132,632
22	159,707,132,632	743,069,294	11,273,421,909	10,817,170,456	159,993,950,473
23	159,993,950,473	686,639,332	11,441,642,795	10,829,517,909	160,068,464,919
24	160,068,464,919	629,547,276	11,601,480,005	10,827,269,808	159,923,801,998
25	159,923,801,998	571,770,814	11,753,724,256	10,809,917,002	159,551,765,557
26	159,551,765,557	513,836,802	11,898,866,348	10,776,887,000	158,943,623,011
27	158,943,623,011	456,345,021	12,034,982,164	10,727,655,363	158,092,641,231
28	158,092,641,231	432,806,330	12,160,043,146	10,662,973,614	157,028,378,030
29	157,028,378,030	373,157,961	12,269,242,355	10,582,665,475	155,714,959,112
30	155,714,959,112	315,984,671	12,361,732,165	10,485,576,537	154,154,788,155
31	154,154,788,155	262,894,761	12,435,243,658	10,372,008,463	152,354,447,721
32	152,354,447,721	215,226,512	12,479,980,073	10,242,805,169	150,332,499,328
33	150,332,499,328	173,284,704	12,493,133,779	10,099,373,053	148,112,023,307
34	148,112,023,307	137,409,010	12,473,823,433	9,943,369,750	145,718,978,634
35	145,718,978,634	107,610,130	12,418,894,371	9,776,721,303	143,184,415,696
36	143,184,415,696	83,397,152	12,329,517,486	9,601,544,060	140,539,839,423
37	140,539,839,423	63,924,486	12,207,981,952	9,419,935,505	137,815,717,462
38	137,815,717,462	48,371,296	12,055,157,614	9,233,970,199	135,042,901,342
39	135,042,901,342	36,165,219	11,873,233,314	9,045,712,743	132,251,545,990
40	132,251,545,990	26,755,898	11,663,031,171	8,857,226,756	129,472,497,473
41	129,472,497,473	19,597,350	11,424,181,146	8,670,665,410	126,738,579,087
42	126,738,579,087	14,219,101	11,155,876,400	8,488,337,910	124,085,259,697
43	124,085,259,697	10,223,599	10,858,609,295	8,312,696,454	121,549,570,456
44	121,549,570,456	7,297,195	10,535,876,756	8,146,202,111	119,167,193,006
45	119,167,193,006	5,207,451	10,194,049,601	7,991,125,389	116,969,476,245
46	116,969,476,245	3,691,365	9,838,357,526	7,849,471,718	114,984,281,802
47	114,984,281,802	2,575,058	9,470,821,897	7,723,115,879	113,239,150,843
48	113,239,150,843	1,768,840	9,092,865,872	7,613,933,699	111,761,987,510
49	111,761,987,510	1,169,346	8,706,417,074	7,523,808,585	110,580,548,367
50	110,580,548,367	728,050	8,312,869,981	7,454,633,846	109,723,040,283



# 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	\$ 109,723,040,283	\$ 418,481	\$ 7,913,096,007	\$ 7,408,353,069	\$ 109,218,715,825
52	109,218,715,825	214,419	7,508,043,079	7,386,980,414	109,097,867,579
53	109,097,867,579	95,521	7,098,724,302	7,392,600,804	109,391,839,603
54	109,391,839,603	41,199	6,686,367,687	7,427,365,361	110,132,878,476
55	110,132,878,476	18,006	6,272,593,969	7,493,474,428	111,353,776,942
56	111,353,776,942	6,437	5,859,091,709	7,593,164,726	113,087,856,396
57	113,087,856,396	1,430	5,447,604,446	7,728,708,587	115,368,961,968
58	115,368,961,968	70	5,040,024,508	7,902,409,959	118,231,347,488
59	118,231,347,488	16	4,638,340,276	8,116,598,112	121,709,605,340
60	121,709,605,340	-	4,244,606,740	8,373,623,761	125,838,622,361
61	125,838,622,361	-	3,860,900,965	8,675,857,518	130,653,578,914
62	130,653,578,914	-	3,489,261,550	9,025,691,862	136,190,009,225
63	136,190,009,225	-	3,131,678,279	9,425,545,724	142,483,876,670
64	142,483,876,670	-	2,790,071,447	9,877,870,468	149,571,675,690
65	149,571,675,690	-	2,466,207,122	10,385,159,937	157,490,628,505
66	157,490,628,505	-	2,161,625,356	10,949,966,697	166,278,969,846
67	166,278,969,846	-	1,877,601,546	11,574,923,294	175,976,291,594
68	175,976,291,594	-	1,615,129,415	12,262,766,969	186,623,929,148
69	186,623,929,148	-	1,374,943,957	13,016,365,909	198,265,351,100
70	198,265,351,100	-	1,157,537,597	13,838,745,973	210,946,559,477
71	210,946,559,477	-	963,129,852	14,733,119,750	224,716,549,375
72	224,716,549,375	-	791,632,363	15,702,919,936	239,627,836,947
73	239,627,836,947	-	642,607,613	16,751,837,716	255,737,067,050
74	255,737,067,050	-	515,202,683	17,883,867,577	273,105,731,944
75	273,105,731,944	-	408,103,176	19,103,359,204	291,800,987,973
76	291,800,987,973	-	319,554,708	20,415,073,906	311,896,507,171
77	311,896,507,171	-	247,469,414	21,824,240,564	333,473,278,320
78	333,473,278,320	-	189,604,511	23,336,605,562	356,620,279,371
79	356,620,279,371	-	143,745,528	24,958,473,554	381,435,007,398
80	381,435,007,398	-	107,830,518	26,696,740,281	408,023,917,160
81	408,023,917,160	-	80,018,813	28,558,920,910	436,502,819,258
82	436,502,819,258	-	58,720,394	30,553,176,894	466,997,275,758
83	466,997,275,758	-	42,590,768	32,688,343,838	499,643,028,828
84	499,643,028,828	-	30,514,052	34,973,962,089	534,586,476,864
85	534,586,476,864	-	21,576,014	37,420,310,992	571,985,211,842
86	571,985,211,842	-	15,039,661	40,038,447,344	612,008,619,525
87	612,008,619,525	-	10,323,333	42,840,248,161	654,838,544,353
88	654,838,544,353	-	6,969,875	45,838,458,285	700,670,032,763
89	700,670,032,763	-	4,623,810	49,046,743,197	749,712,152,150
90	749,712,152,150	-	3,011,962	52,479,747,015	802,188,887,202
91	802,188,887,202	-	1,923,905	56,153,155,906	858,340,119,204
92	858,340,119,204	-	1,202,193	60,083,766,979	918,422,683,990
93	918,422,683,990	-	732,540	64,289,562,674	982,711,514,124
94	982,711,514,124	-	432,048	68,789,791,123	1,051,500,873,199
95	1,051,500,873,199	-	243,001	73,605,052,763	1,125,105,682,960
96	1,125,105,682,960	-	127,420	78,757,393,423	1,203,862,948,963
97	1,203,862,948,963	-	60,781	84,270,404,336	1,288,133,292,518
98	1,288,133,292,518	-	26,309	90,169,329,571	1,378,302,595,781
99	1,378,302,595,781	-	10,904	96,481,181,329	1,474,783,766,206
100	1,474,783,766,206	-	6,139	103,234,863,423	1,578,018,623,490



# Single Discount Rate Development

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

Year	Projected Beginning Plan Net Position	Projected Benefit		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)
		Payments Including Dividends	Funded Portion of Benefit Payments				
(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	\$ 5,985,734,661	\$ 5,985,734,661	\$ -	\$ 5,786,628,110	\$ -	\$ 5,786,628,110
2	115,866,335,605	6,272,592,753	6,272,592,753	-	5,667,237,659	-	5,667,237,659
3	119,521,818,356	6,572,965,015	6,572,965,015	-	5,550,113,653	-	5,550,113,653
4	123,003,758,228	6,806,519,918	6,806,519,918	-	5,371,330,776	-	5,371,330,776
5	126,375,322,510	7,148,645,194	7,148,645,194	-	5,272,259,072	-	5,272,259,072
6	129,574,092,569	7,412,560,897	7,412,560,897	-	5,109,254,040	-	5,109,254,040
7	132,605,523,715	7,671,760,195	7,671,760,195	-	4,941,974,091	-	4,941,974,091
8	135,529,624,900	7,934,935,950	7,934,935,950	-	4,777,108,364	-	4,777,108,364
9	138,335,355,451	8,205,001,839	8,205,001,839	-	4,616,539,676	-	4,616,539,676
10	141,007,691,011	8,473,873,569	8,473,873,569	-	4,455,906,733	-	4,455,906,733
11	143,538,731,157	8,748,089,564	8,748,089,564	-	4,299,159,472	-	4,299,159,472
12	145,912,961,214	9,018,552,708	9,018,552,708	-	4,142,126,942	-	4,142,126,942
13	148,122,671,909	9,282,470,431	9,282,470,431	-	3,984,431,395	-	3,984,431,395
14	150,162,079,261	9,537,377,470	9,537,377,470	-	3,826,026,491	-	3,826,026,491
15	152,027,679,338	9,782,559,123	9,782,559,123	-	3,667,648,482	-	3,667,648,482
16	153,716,615,491	10,027,704,292	10,027,704,292	-	3,513,605,226	-	3,513,605,226
17	155,215,518,725	10,268,832,471	10,268,832,471	-	3,362,704,747	-	3,362,704,747
18	156,514,282,478	10,494,864,035	10,494,864,035	-	3,211,890,324	-	3,211,890,324
19	157,613,680,509	10,705,448,052	10,705,448,052	-	3,061,998,413	-	3,061,998,413
20	158,515,010,287	10,906,222,834	10,906,222,834	-	2,915,350,006	-	2,915,350,006
21	159,214,074,152	11,096,738,400	11,096,738,400	-	2,772,221,359	-	2,772,221,359
22	159,707,132,632	11,273,421,909	11,273,421,909	-	2,632,113,063	-	2,632,113,063
23	159,993,950,473	11,441,642,795	11,441,642,795	-	2,496,625,415	-	2,496,625,415
24	160,068,464,919	11,601,480,005	11,601,480,005	-	2,365,890,390	-	2,365,890,390
25	159,923,801,998	11,753,724,256	11,753,724,256	-	2,240,128,568	-	2,240,128,568
26	159,551,765,557	11,898,866,348	11,898,866,348	-	2,119,430,869	-	2,119,430,869
27	158,943,623,011	12,034,982,164	12,034,982,164	-	2,003,435,395	-	2,003,435,395
28	158,092,641,231	12,160,043,146	12,160,043,146	-	1,891,826,173	-	1,891,826,173
29	157,028,378,030	12,269,242,355	12,269,242,355	-	1,783,939,333	-	1,783,939,333
30	155,714,959,112	12,361,732,165	12,361,732,165	-	1,679,801,203	-	1,679,801,203
31	154,154,788,155	12,435,243,658	12,435,243,658	-	1,579,243,434	-	1,579,243,434
32	152,354,447,721	12,479,980,073	12,479,980,073	-	1,481,238,170	-	1,481,238,170
33	150,332,499,328	12,493,133,779	12,493,133,779	-	1,385,793,806	-	1,385,793,806
34	148,112,023,307	12,473,823,433	12,473,823,433	-	1,293,132,539	-	1,293,132,539
35	145,718,978,634	12,418,894,371	12,418,894,371	-	1,203,213,242	-	1,203,213,242
36	143,184,415,696	12,329,517,486	12,329,517,486	-	1,116,405,515	-	1,116,405,515
37	140,539,839,423	12,207,981,952	12,207,981,952	-	1,033,084,851	-	1,033,084,851
38	137,815,717,462	12,055,157,614	12,055,157,614	-	953,413,352	-	953,413,352
39	135,042,901,342	11,873,233,314	11,873,233,314	-	877,593,830	-	877,593,830
40	132,251,545,990	11,663,031,171	11,663,031,171	-	805,660,771	-	805,660,771
41	129,472,497,473	11,424,181,146	11,424,181,146	-	737,534,066	-	737,534,066
42	126,738,579,087	11,155,876,400	11,155,876,400	-	673,095,861	-	673,095,861
43	124,085,259,697	10,858,609,295	10,858,609,295	-	612,299,148	-	612,299,148
44	121,549,570,456	10,535,876,756	10,535,876,756	-	555,234,384	-	555,234,384
45	119,167,193,006	10,194,049,601	10,194,049,601	-	502,075,044	-	502,075,044
46	116,969,476,245	9,838,357,526	9,838,357,526	-	452,856,615	-	452,856,615
47	114,984,281,802	9,470,821,897	9,470,821,897	-	407,419,684	-	407,419,684
48	113,239,150,843	9,092,865,872	9,092,865,872	-	365,570,670	-	365,570,670
49	111,761,987,510	8,706,417,074	8,706,417,074	-	327,134,426	-	327,134,426
50	110,580,548,367	8,312,869,981	8,312,869,981	-	291,913,374	-	291,913,374



# Single Discount Rate Development

## Present Values of Projected Benefits Ending December 31, 2119(Concluded)

Year	Projected Beginning Plan Net Position	Projected Benefit		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)
		Payments Including Dividends	Funded Portion of Benefit Payments				
(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	\$ 169,993,764,569	\$ 7,785,142,016	\$ 7,785,142,016	\$ -	\$ 255,496,977	\$ -	\$ 255,496,977
52	173,840,747,450	7,386,638,755	7,386,638,755	-	226,559,517	-	226,559,517
53	178,369,023,027	6,983,938,621	6,983,938,621	-	200,194,474	-	200,194,474
54	183,630,711,163	6,578,249,773	6,578,249,773	-	176,229,356	-	176,229,356
55	189,680,309,085	6,171,166,736	6,171,166,736	-	154,508,151	-	154,508,151
56	196,574,444,839	5,764,350,767	5,764,350,767	-	134,880,988	-	134,880,988
57	204,371,971,839	5,359,517,213	5,359,517,213	-	117,203,945	-	117,203,945
58	213,134,083,634	4,958,527,803	4,958,527,803	-	101,341,082	-	101,341,082
59	222,924,328,518	4,563,338,766	4,563,338,766	-	87,162,909	-	87,162,909
60	233,808,677,207	4,175,971,863	4,175,971,863	-	74,545,733	-	74,545,733
61	245,855,625,728	3,798,470,573	3,798,470,573	-	63,370,950	-	63,370,950
62	259,136,351,016	3,432,840,531	3,432,840,531	-	53,524,338	-	53,524,338
63	273,724,937,731	3,081,039,347	3,081,039,347	-	44,896,361	-	44,896,361
64	289,698,631,490	2,744,956,264	2,744,956,264	-	37,382,259	-	37,382,259
65	307,138,130,857	2,426,328,793	2,426,328,793	-	30,881,330	-	30,881,330
66	326,127,985,998	2,126,672,084	2,126,672,084	-	25,296,655	-	25,296,655
67	346,757,098,308	1,847,240,912	1,847,240,912	-	20,535,360	-	20,535,360
68	369,119,294,332	1,589,012,930	1,589,012,930	-	16,509,063	-	16,509,063
69	393,313,957,180	1,352,711,247	1,352,711,247	-	13,134,584	-	13,134,584
70	419,446,678,788	1,138,820,326	1,138,820,326	-	10,334,338	-	10,334,338
71	447,629,941,398	947,556,136	947,556,136	-	8,036,161	-	8,036,161
72	477,983,877,607	778,831,745	778,831,745	-	6,173,103	-	6,173,103
73	510,637,119,218	632,216,710	632,216,710	-	4,683,193	-	4,683,193
74	545,727,747,513	506,871,906	506,871,906	-	3,509,058	-	3,509,058
75	583,404,377,463	401,504,187	401,504,187	-	2,597,758	-	2,597,758
76	623,827,364,725	314,387,539	314,387,539	-	1,901,035	-	1,901,035
77	667,170,075,256	243,467,858	243,467,858	-	1,375,887	-	1,375,887
78	713,620,135,413	186,538,624	186,538,624	-	985,204	-	985,204
79	763,380,587,839	141,421,176	141,421,176	-	698,052	-	698,052
80	816,670,941,785	106,086,909	106,086,909	-	489,386	-	489,386
81	873,728,170,558	78,724,916	78,724,916	-	339,405	-	339,405
82	934,807,708,811	57,770,891	57,770,891	-	232,772	-	232,772
83	1,000,184,489,753	41,902,080	41,902,080	-	157,788	-	157,788
84	1,070,154,060,187	30,020,643	30,020,643	-	105,651	-	105,651
85	1,145,033,790,805	21,227,132	21,227,132	-	69,817	-	69,817
86	1,225,164,198,645	14,796,471	14,796,471	-	45,483	-	45,483
87	1,310,910,386,962	10,156,405	10,156,405	-	29,177	-	29,177
88	1,402,663,608,182	6,857,173	6,857,173	-	18,410	-	18,410
89	1,500,842,967,640	4,549,044	4,549,044	-	11,414	-	11,414
90	1,605,897,269,807	2,963,259	2,963,259	-	6,949	-	6,949
91	1,718,307,013,474	1,892,796	1,892,796	-	4,148	-	4,148
92	1,838,586,546,494	1,182,753	1,182,753	-	2,423	-	2,423
93	1,967,286,381,300	720,695	720,695	-	1,380	-	1,380
94	2,104,995,682,498	425,062	425,062	-	760	-	760
95	2,252,344,940,585	239,072	239,072	-	400	-	400
96	2,410,008,839,128	125,359	125,359	-	196	-	196
97	2,578,709,328,194	59,798	59,798	-	87	-	87
98	2,759,218,919,312	25,883	25,883	-	35	-	35
99	2,952,364,216,890	10,728	10,728	-	14	-	14
100	3,159,029,700,975	6,040	6,040	-	7	-	7
<b>Totals</b>					\$ 126,007,882,806	\$ -	\$ 126,007,882,806



## **SECTION F**

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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 are as follows:

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 3.0% per year. The wage inflation rate is defined to be the portion of total pay increases for an individual that are due to macroeconomic 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 2019	Present Value of \$1 Monthly for Life*		Future Life Expectancy (years)*		Mortality Rates*	
	Males	Females	Males	Females	Males	Females
40	\$212.96	\$217.63	45.3	48.2	0.000990	0.000614
45	204.65	210.28	40.3	43.1	0.001238	0.000921
50	194.18	201.13	35.3	38.1	0.001615	0.001339
55	181.54	189.97	30.4	33.2	0.003763	0.002413
60	167.29	176.71	25.8	28.4	0.005438	0.003515
65	150.31	160.75	21.3	23.7	0.008324	0.005262
70	131.09	141.76	17.1	19.2	0.013497	0.008737
75	109.61	120.10	13.2	15.0	0.022662	0.015813
80	86.87	96.74	9.7	11.1	0.041599	0.029763
85	65.44	73.54	6.8	7.9	0.077801	0.059843

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

The values shown above are for non-disabled participants in 2019. For disabled participants, the following table was used:

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

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

## Active Participant Mortality Rates

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

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

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

# Rates of Retirement for Those Eligible to Retire

## Normal Retirement

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

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

## Reduced Retirement

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

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

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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. If there is no eligible beneficiary, a refund of contributions is paid to the estate.

**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 H**

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### **GLOSSARY OF TERMS**

## 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 Actuarial Accrued Liability 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 value of the assets of the trust.
<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 (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 statement 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>	The total pension expense is the sum of the following items that are recognized at the end of the employer's fiscal year: <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 the GASB Statement No. 67, the valuation asset is equal to the market value of assets.