

Wisconsin Retirement System

GASB Statement No. 67 Plan Reporting and
Accounting Schedules

December 31, 2017



Table of Contents

		<u>Page</u>
Section A	Executive Summary	
	Executive Summary.....	1
	Discussion.....	2
Section B	Financial Statements	
	Statement of Fiduciary Net Position	6
	Statement of Changes in Fiduciary Net Position	7
Section C	Required Supplementary Information	
	Multiyear Schedule of Changes in Net Pension Liability/(Asset) and Related Ratios	8
	Multiyear Schedule of Net Pension Liability/(Asset)	9
	Multiyear Schedule of Contributions	10
	Notes to Schedule of Contributions.....	11
	Multiyear Schedule of Investment Returns	12
Section D	Notes to Financial Statements	
	Asset Allocation.....	13
	Sensitivity of Net Pension Liability/(Asset) to the Single Discount Rate Assumption	14
	Summary of Population Statistics	15
Section E	Calculation of the Single Discount Rate	
	Calculation of the Single Discount Rate	16
	Projection of Contributions.....	17
	Projection of Plan Fiduciary Net Position	19
	Present Values of Projected Benefits.....	21
Section F	Summary of Assumptions	23
Section G	Plan Provisions	28
Section H	Glossary of Terms.....	32



August 31, 2018

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." This report replaces our earlier report dated May 22, 2018.

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.

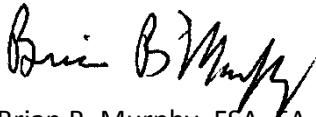
The report was based upon information, furnished by the Department of Employee Trust Funds (DETF), concerning Retirement System benefits, financial transactions, and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not audit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

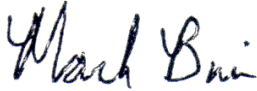
This report is intended to assist in preparation of the financial statements of WRS and its participating employers. Financial statements are the responsibility of the reporting entity and not the actuary. The statements are subject to an auditor's review. Please let us know if the plan's auditor recommends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


Respectfully submitted,



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



Mark Buis, FSA, EA, FCA, MAAA



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

BBM/MB/JDA:sc

SECTION A

EXECUTIVE SUMMARY

Executive Summary as of December 31, 2017

	2017
Actuarial Valuation Date	December 31, 2017
Pension Plan's Fiscal Year Ending Date (Measurement Date & Reporting Date)	December 31, 2017
 Membership	
Number of	
- Retirees and Beneficiaries	203,202
- Inactive, Nonretired Members	165,051
- Active Members	256,383
- Total	624,636
Covered Payroll ⁽¹⁾	\$ 13,943,116,649
 Net Pension Liability/(Asset)	
Total Pension Liability	\$ 101,772,791,613
Plan Fiduciary Net Position	104,396,462,327
Net Pension Liability/(Asset)	\$ (2,623,670,714)
Plan Fiduciary Net Position as a Percentage of Total Pension Liability/(Asset)	102.58%
Net Pension Liability/(Asset) as a Percentage of Covered Payroll	-18.82%
 Development of the Single Discount Rate	
Single Discount Rate	7.20%
Long-Term Expected Rate of Return	7.20%
Long-Term Municipal Bond Rate ⁽²⁾	3.31%
Last year ending December 31 in the 2018 to 2117 projection period for which projected benefit payments are fully funded	2117

⁽¹⁾ Covered Payroll was provided by DETF.

⁽²⁾ Source: Fixed-income municipal bonds with 20 years to maturity that include only federally tax-exempt municipal bonds as reported in Fidelity Index's "20-year Municipal GO AA Index" as of December 29, 2017. 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 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.

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

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 7.2% 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 2117. 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 a 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, 2017 and a measurement date of December 31, 2017.

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 7.20%; the municipal bond rate is 3.31% (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 7.20%.

Actuarial Assumptions and Methods and Member Census Data

The liability and asset values used in this study are taken from the December 31, 2016 and December 31, 2017 Actuarial Valuation Reports 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 Reports.

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, 2016 and December 31, 2017 Actuarial Valuation Reports of the Retirement System.

The Wisconsin Retirement System uses the Frozen Initial Liability 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

FINANCIAL STATEMENTS

Statement of Fiduciary Net Position as of December 31, 2017

	2017
Assets	
Cash and Deposits	\$ 5,119,922,114
Receivables	
Accounts Receivable - Sale of Investments	\$ 1,279,157,631
Accrued Interest and Other Dividends	314,111,871
Contributions	197,398,712
Accounts Receivable - Other	11,340,572
Total Receivables	\$ 1,802,008,786
Investments	
Fixed Income	\$ 30,709,367,962
Domestic and International Equities	63,241,061,048
Real Estate	1,368,582,805
Other	17,331,073,153
Total Investments	\$ 112,650,084,968
Total Assets	\$ 119,572,015,868
Liabilities	
Payables	
Accounts Payable - Purchase of Investments	\$ 14,689,190,021
Accrued Expenses	5,816,840
Accounts Payable - Other	480,546,680
Total Liabilities	\$ 15,175,553,541
Net Position Restricted for Pensions	\$ 104,396,462,327

Statement of Changes in Fiduciary Net Position for Year Ended December 31, 2017

	2017
Additions	
Contributions	
Employer	\$ 1,017,558,990
Employee	965,452,633
Other	-
Total Contributions	\$ 1,983,011,623
Investment Income	
Net Appreciation in Fair Value of Investments	\$ 13,558,043,254
Interest and Dividends	1,812,975,274
Less Investment Expense	(495,603,892)
Net Investment Income	\$ 14,875,414,636
Other	\$ -
Total Additions	\$ 16,858,426,259
 Deductions	
Benefit payments, including refunds of employee contributions	\$ 5,249,625,087
Pension Plan Administrative Expense	26,132,873
Other Benefit Expenses	-
Total Deductions	\$ 5,275,757,960
Net Increase in Net Position	\$ 11,582,668,299
 Net Position Restricted for Pensions	
Beginning of Year ⁽¹⁾	\$ 92,813,794,028
End of Year	\$ 104,396,462,327

⁽¹⁾ Includes \$233,691,533 asset adjustment for LTDI (provided by DETF).

SECTION C

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,	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
Total Pension Liability										
Service Cost	\$ 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	6,604,529,732	6,363,034,249	6,349,703,745	6,089,287,273	5,680,664,977					
Benefit Changes	-	-	-	-	-					
Difference between Expected and Actual Experience	5,142,055,157	318,473,379	(4,488,825,613)	473,101,546	2,659,920,220					
Assumption Changes	-	-	1,484,977,863	-	-					
Benefit Payments	(5,211,266,989)	(5,022,920,827)	(4,823,586,513)	(4,540,247,874)	(4,224,700,261)					
Refunds	(38,358,098)	(39,275,602)	(37,642,404)	(34,401,181)	(33,271,143)					
Net Change in Total Pension Liability	8,339,839,123	3,433,445,998	272,497,394	3,744,760,674	5,827,662,298					
Total Pension Liability - Beginning	93,432,952,490	89,999,506,492	89,727,009,098	85,982,248,424	80,154,586,126					
Total Pension Liability - Ending (a)⁽¹⁾	\$ 101,772,791,613	\$ 93,432,952,490	\$ 89,999,506,492	\$ 89,727,009,098	\$ 85,982,248,424					
Plan Fiduciary Net Position										
Employer Contributions	\$ 1,017,558,990	\$ 963,121,911	\$ 977,733,921	\$ 987,792,834	\$ 914,698,118					
Employee Contributions	965,452,633	921,863,806	937,225,184	941,903,267	871,259,789					
Pension Plan Net Investment Income	14,875,414,636	7,273,069,087	(673,122,812)	4,891,014,826	11,347,296,075					
Benefit Payments	(5,211,266,989)	(5,022,920,827)	(4,823,586,513)	(4,540,247,874)	(4,224,700,261)					
Refunds	(38,358,098)	(39,275,602)	(37,642,404)	(34,401,181)	(33,271,143)					
Pension Plan Administrative Expense	(26,132,873)	(20,426,189)	(22,708,614)	(24,036,951)	(22,857,502)					
Other	-	-	-	-	-					
Net Change in Plan Fiduciary Net Position	11,582,668,299	4,075,432,186	(3,642,101,238)	2,222,024,921	8,852,425,076					
Plan Fiduciary Net Position - Beginning⁽²⁾	92,813,794,028	88,504,670,309	92,146,771,547	89,924,746,626	81,072,321,550					
Plan Fiduciary Net Position - Ending (b)	\$ 104,396,462,327	\$ 92,580,102,495	\$ 88,504,670,309	\$ 92,146,771,547	\$ 89,924,746,626					
Net Pension Liability/(Asset) - Ending (a) - (b)	(2,623,670,714)	852,849,995	1,494,836,183	(2,419,762,449)	(3,942,498,202)					
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	102.58 %	99.09 %	98.34 %	102.70 %	104.59 %					
Covered-Employee Payroll⁽³⁾	\$ 13,943,116,649	\$ 13,706,000,000	\$ 13,530,500,000	\$ 13,219,500,000	\$ 12,884,800,000					
Net Pension Liability/(Asset) as a Percentage of Covered-Employee Payroll	(18.82)%	6.22 %	11.05 %	(18.30)%	(30.60)%					

Notes to Schedule:

⁽¹⁾ In 2017, end of year liabilities were adjusted to reflect the Long Term Disability Insurance (LTDI) program.

⁽²⁾ 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.

⁽³⁾ 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 ⁽¹⁾	Net Pension Liability/(Asset) as a % of Covered Payroll
2008						
2009						
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)%

⁽¹⁾ 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 ⁽¹⁾	Actual Contribution	Contribution Deficiency (Excess)	Covered Payroll ⁽³⁾	Actual Contribution as a % of Covered Payroll
2008					
2009					
2010					
2011					
2012					
2013	\$ 905,148,514	\$ 905,148,514	-	\$ 12,884,800,000	7.02%
2014 ⁽²⁾	977,068,988	977,068,988	-	13,219,500,000	7.39%
2015 ⁽²⁾	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%

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

⁽²⁾ The Actuarially Determined Contribution (ADC) included Prior Service Contributions, Early Retirement Contributions, Employer Additional Contributions, and Employer Required Contributions.

⁽³⁾ Covered payroll provided by DETF.

Notes to Schedule of Contributions

Valuation Date: December 31, 2015

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%
Post-retirement active participants	5.00%
Pre-retirement active 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	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 2017 was determined from the December 31, 2015 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 Return¹</u>	<u>Variable Annual Return¹</u>
2008		
2009		
2010		
2011		
2012		
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 %

¹ 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

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, 2017, these best estimates of geometric real rates of return were provided by DETF and are summarized in the following tables:

Core Asset Allocation

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return
Equities	50.00%	5.30%
Fixed Income	24.50%	1.40%
Inflation Sens. Assets	15.50%	1.00%
Real Estate	8.00%	3.60%
Private Equity/Debt	8.00%	6.50%
Multi-asset	4.00%	3.60%
Cash	-10.00%	0.90%
Total	100.00%	

Variable Asset Allocation

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return
Domestic Equity	70.00%	4.60%
International Equity	30.00%	4.90%
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
Total	100.00%	

Single Discount Rate

A single discount rate of 7.20% 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 7.20% and a long-term bond rate of 3.31%. Because of the unique structure of WRS, the 7.2% expected rate of return implies that a dividend of approximately 2.1% 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 7.20%, as well as what the plan's net pension liability/(asset) would be if it were calculated using a single discount rate that is 100 basis points lower or 100 basis points higher:

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

	Current Single Discount		
	1% Decrease	Rate Assumption	1% Increase
Discount Rate	6.20%	7.20%	8.20%
Ultimate Dividend Rate	2.10%	2.10%	2.10%
Total Pension Liability	\$ 112,050,883,938	\$ 101,772,791,613	\$ 93,372,748,048
Plan Fiduciary Net Position	104,396,462,327	104,396,462,327	104,396,462,327
Net Pension Liability/(Asset)	\$ 7,654,421,611	\$ (2,623,670,714)	\$ (11,023,714,279)

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 1.1% for the 6.2% discount rate, 2.1% for the 7.2% discount rate, and 3.0% for the 8.2% discount rate.

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

	Current Single Discount		
	1% Decrease	Rate Assumption	1% Increase
Discount Rate	6.20%	7.20%	8.20%
Ultimate Dividend Rate	1.10%	2.10%	3.00%
Total Pension Liability	\$ 105,016,193,926	\$ 101,772,791,613	\$ 97,642,714,257
Plan Fiduciary Net Position	104,396,462,327	104,396,462,327	104,396,462,327
Net Pension Liability/(Asset)	\$ 619,731,599	\$ (2,623,670,714)	\$ (6,753,748,070)

Summary of Population Statistics

Inactive Plan Members or Beneficiaries Currently Receiving Benefits	203,202
Inactive Plan Members Entitled to But Not Yet Receiving Benefits	165,051
Active Plan Members	<u>256,383</u>
Total Plan Members	624,636

SECTION E

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 7.20%; the municipal bond rate is 3.31%; and the resulting single discount rate is 7.20%.

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 2016 actuarial valuations (13.9%). 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 13.4% 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, 2117

Year	Payroll for Current Employees	Contributions from Current Employees	Normal Cost Contributions	UAL Contributions	Total Contributions
0	\$ 13,720,424,748				
1	13,719,693,139	\$ 919,192,001	\$ 987,845,345	\$ -	\$ 1,907,037,346
2	13,356,024,065	894,826,900	961,660,445	-	1,856,487,345
3	13,036,660,851	867,146,533	931,912,664	-	1,799,059,197
4	12,725,246,673	828,031,801	889,876,500	-	1,717,908,301
5	12,413,017,099	789,765,800	848,752,457	-	1,638,518,257
6	12,098,612,902	769,762,147	827,254,756	-	1,597,016,903
7	11,781,493,023	749,585,712	805,571,367	-	1,555,157,079
8	11,457,377,486	728,964,185	783,409,643	-	1,512,373,828
9	11,126,314,206	707,900,615	760,772,860	-	1,468,673,475
10	10,790,161,461	686,513,233	737,788,080	-	1,424,301,313
11	10,447,371,876	664,703,588	714,349,500	-	1,379,053,088
12	10,095,303,003	642,303,558	690,276,438	-	1,332,579,996
13	9,733,919,606	619,310,901	665,566,487	-	1,284,877,388
14	9,363,824,635	595,763,979	640,260,873	-	1,236,024,852
15	8,983,398,096	571,559,721	614,248,828	(0)	1,185,808,549
16	8,593,907,731	546,778,786	587,617,035	(0)	1,134,395,821
17	8,196,519,478	521,495,355	560,445,216	(0)	1,081,940,571
18	7,788,912,776	495,561,786	532,574,700	(0)	1,028,136,486
19	7,372,102,409	469,042,644	504,074,874	-	973,117,518
20	6,947,930,873	442,055,154	475,071,721	(0)	917,126,875
21	6,517,881,404	414,693,686	445,666,659	(0)	860,360,345
22	6,083,880,436	387,080,809	415,991,409	(0)	803,072,218
23	5,648,165,499	359,358,882	386,198,964	(0)	745,557,846
24	5,211,158,207	331,554,730	356,318,153	-	687,872,883
25	4,771,111,018	303,557,167	326,229,487	-	629,786,654
26	4,326,037,581	275,239,815	295,797,146	-	571,036,961
27	3,875,778,766	246,592,548	265,010,249	-	511,602,797
28	3,424,409,037	217,874,601	234,147,392	-	452,021,993
29	2,977,540,675	192,313,397	206,677,053	-	398,990,450
30	2,542,786,289	164,233,481	176,499,882	-	340,733,363
31	2,134,847,421	137,885,525	148,184,029	-	286,069,554
32	1,765,315,167	114,018,176	122,534,056	-	236,552,232
33	1,438,423,353	92,904,887	99,843,842	-	192,748,729
34	1,157,097,951	74,734,642	80,316,483	-	155,051,125
35	920,823,904	59,474,174	63,916,229	-	123,390,403
36	726,469,369	46,921,203	50,425,692	-	97,346,895
37	568,075,572	36,690,865	39,431,262	-	76,122,127
38	439,912,315	28,413,057	30,535,193	-	58,948,250
39	336,993,526	21,765,738	23,391,394	-	45,157,132
40	255,376,642	16,494,267	17,726,203	-	34,220,470
41	192,062,949	12,404,962	13,331,473	-	25,736,435
42	143,285,445	9,254,521	9,945,729	-	19,200,250
43	105,806,443	6,833,826	7,344,237	-	14,178,063
44	77,423,283	5,000,615	5,374,105	-	10,374,720
45	56,087,744	3,622,595	3,893,163	-	7,515,758
46	40,073,355	2,588,258	2,781,572	-	5,369,830
47	28,188,977	1,820,670	1,956,653	-	3,777,323
48	19,344,967	1,249,453	1,342,773	-	2,592,226
49	12,791,835	826,199	887,907	-	1,714,106
50	8,064,969	520,900	559,806	-	1,080,706

Single Discount Rate Development

Projection of Contributions Ending December 31, 2117

(Concluded)

Year	Payroll for Current Employees	Contributions from Current Employees	Normal Cost Contributions	UAL Contributions	Total Contributions
51	\$ 4,668,534	\$ 301,531	\$ 324,053	\$ -	\$ 625,584
52	2,363,132	152,630	164,030	-	316,660
53	1,048,345	67,710	72,768	-	140,478
54	447,533	28,905	31,064	-	59,969
55	191,269	12,354	13,276	-	25,630
56	60,682	3,919	4,212	-	8,131
57	10,117	654	702	-	1,356
58	205	13	15	-	28
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, 2117

Year	Projected Beginning Plan Net Position	Projected Total Contributions	Projected Benefit Payments Including Dividends	Projected Investment Earnings at 7.20%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)=(a)+(b)-(c)+(d)
1	\$ 104,396,462,327	\$ 1,907,037,346	\$ 5,453,105,031	\$ 7,391,105,525	\$ 108,241,500,166
2	108,241,500,166	1,856,487,345	5,650,096,863	7,659,191,623	112,107,082,271
3	112,107,082,271	1,799,059,197	5,858,977,318	7,928,093,046	115,975,257,197
4	115,975,257,197	1,717,908,301	6,145,383,863	8,193,599,543	119,741,381,178
5	119,741,381,178	1,638,518,257	6,449,269,474	8,451,202,351	123,381,832,313
6	123,381,832,313	1,597,016,903	6,717,929,553	8,702,343,081	126,963,262,744
7	126,963,262,744	1,555,157,079	6,992,027,784	8,949,029,268	130,475,421,306
8	130,475,421,306	1,512,373,828	7,277,898,790	9,190,278,760	133,900,175,104
9	133,900,175,104	1,468,673,475	7,565,984,867	9,425,124,312	137,227,988,024
10	137,227,988,024	1,424,301,313	7,855,455,393	9,652,917,381	140,449,751,325
11	140,449,751,325	1,379,053,088	8,157,347,534	9,872,604,481	143,544,061,361
12	143,544,061,361	1,332,579,996	8,460,734,352	10,083,018,745	146,498,925,750
13	146,498,925,750	1,284,877,388	8,756,728,331	10,283,610,945	149,310,685,752
14	149,310,685,752	1,236,024,852	9,042,117,527	10,474,234,088	151,978,827,165
15	151,978,827,165	1,185,808,549	9,319,027,419	10,654,768,400	154,500,376,695
16	154,500,376,695	1,134,395,821	9,594,678,138	10,824,750,317	156,864,844,695
17	156,864,844,695	1,081,940,571	9,865,892,292	10,983,542,425	159,064,435,399
18	159,064,435,399	1,028,136,486	10,129,109,961	11,130,698,524	161,094,160,448
19	161,094,160,448	973,117,518	10,382,048,572	11,265,944,935	162,951,174,329
20	162,951,174,329	917,126,875	10,618,018,100	11,389,322,039	164,639,605,144
21	164,639,605,144	860,360,345	10,837,033,056	11,501,133,473	166,164,065,906
22	166,164,065,906	803,072,218	11,045,142,853	11,601,506,375	167,523,501,645
23	167,523,501,645	745,557,846	11,240,538,063	11,690,439,241	168,718,960,670
24	168,718,960,670	687,872,883	11,419,451,860	11,768,142,769	169,755,524,461
25	169,755,524,461	629,786,654	11,586,841,975	11,834,799,287	170,633,268,427
26	170,633,268,427	571,036,961	11,744,510,951	11,890,341,188	171,350,135,625
27	171,350,135,625	511,602,797	11,892,490,615	11,934,618,501	171,903,866,308
28	171,903,866,308	452,021,993	12,030,178,379	11,967,508,867	172,293,218,790
29	172,293,218,790	398,990,450	12,155,013,561	11,989,250,330	172,526,446,010
30	172,526,446,010	340,733,363	12,263,643,730	12,000,139,165	172,603,674,809
31	172,603,674,809	286,069,554	12,346,994,736	12,000,817,457	172,543,567,084
32	172,543,567,084	236,552,232	12,400,794,500	11,992,834,929	172,372,159,744
33	172,372,159,744	192,748,729	12,423,925,950	11,978,125,821	172,119,108,345
34	172,119,108,345	155,051,125	12,411,436,627	11,959,014,395	171,821,737,238
35	171,821,737,238	123,390,403	12,363,798,266	11,938,168,873	171,519,498,248
36	171,519,498,248	97,346,895	12,283,696,163	11,918,319,952	171,251,468,932
37	171,251,468,932	76,122,127	12,171,880,972	11,902,226,417	171,057,936,504
38	171,057,936,504	58,948,250	12,030,416,050	11,892,688,794	170,979,157,498
39	170,979,157,498	45,157,132	11,859,769,717	11,892,565,354	171,057,110,267
40	171,057,110,267	34,220,470	11,659,429,074	11,904,877,992	171,336,779,656
41	171,336,779,656	25,736,435	11,429,816,847	11,932,836,449	171,865,535,692
42	171,865,535,692	19,200,250	11,171,522,823	11,979,812,648	172,693,025,768
43	172,693,025,768	14,178,063	10,883,650,682	12,049,397,561	173,872,950,709
44	173,872,950,709	10,374,720	10,569,016,301	12,145,347,596	175,459,656,724
45	175,459,656,724	7,515,758	10,234,836,615	12,271,310,677	177,503,646,544
46	177,503,646,544	5,369,830	9,885,452,649	12,430,761,257	180,054,324,982
47	180,054,324,982	3,777,323	9,522,174,388	12,627,204,495	183,163,132,411
48	183,163,132,411	2,592,226	9,146,857,028	12,864,273,307	186,883,140,916
49	186,883,140,916	1,714,106	8,761,226,102	13,145,724,292	191,269,353,212
50	191,269,353,212	1,080,706	8,366,559,659	13,475,470,231	196,379,344,489

Single Discount Rate Development

Projection of Plan Fiduciary Net Position Ending December 31, 2117 (Concluded)

Year	Projected Beginning Plan Net Position	Projected Total Contributions	Projected Benefit Payments Including Dividends	Projected Investment Earnings at 7.20%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)=(a)+(b)-(c)+(d)
51	\$ 196,379,344,489	\$ 625,584	\$ 7,964,319,140	\$ 13,857,602,492	\$ 202,273,253,426
52	202,273,253,426	316,660	7,555,742,901	14,296,406,117	209,014,233,302
53	209,014,233,302	140,478	7,141,923,740	14,796,389,011	216,668,839,051
54	216,668,839,051	59,969	6,724,335,452	15,362,289,682	225,306,853,251
55	225,306,853,251	25,630	6,304,783,342	15,999,066,864	235,001,162,403
56	235,001,162,403	8,131	5,885,028,262	16,711,905,058	245,828,047,330
57	245,828,047,330	1,356	5,466,766,039	17,506,236,278	257,867,518,925
58	257,867,518,925	28	5,051,910,566	18,387,753,420	271,203,361,808
59	271,203,361,808	-	4,642,574,249	19,362,414,104	285,923,201,663
60	285,923,201,663	-	4,240,986,610	20,436,448,466	302,118,663,520
61	302,118,663,520	-	3,849,434,019	21,616,372,630	319,885,602,131
62	319,885,602,131	-	3,470,232,283	22,909,006,217	339,324,376,065
63	339,324,376,065	-	3,105,649,905	24,321,494,797	360,540,220,957
64	360,540,220,957	-	2,757,793,537	25,861,340,815	383,643,768,234
65	383,643,768,234	-	2,428,563,291	27,536,442,517	408,751,647,461
66	408,751,647,461	-	2,119,598,938	29,355,139,228	435,987,187,751
67	435,987,187,751	-	1,832,210,042	31,326,264,318	465,481,242,027
68	465,481,242,027	-	1,567,398,104	33,459,203,771	497,373,047,693
69	497,373,047,693	-	1,325,907,968	35,763,956,330	531,811,096,055
70	531,811,096,055	-	1,108,223,208	38,251,196,264	568,954,069,111
71	568,954,069,111	-	914,551,719	40,932,341,323	608,971,858,716
72	608,971,858,716	-	744,787,864	43,819,627,457	652,046,698,309
73	652,046,698,309	-	598,413,690	46,926,193,796	698,374,478,415
74	698,374,478,415	-	474,426,530	50,266,179,926	748,166,231,810
75	748,166,231,810	-	371,319,038	53,854,833,529	801,649,746,301
76	801,649,746,301	-	287,100,023	57,708,625,763	859,071,272,041
77	859,071,272,041	-	219,434,968	61,845,369,222	920,697,206,296
78	920,697,206,296	-	165,873,667	66,284,331,184	986,815,663,812
79	986,815,663,812	-	124,043,772	71,046,339,829	1,057,737,959,870
80	1,057,737,959,870	-	91,773,054	76,153,886,700	1,133,800,073,517
81	1,133,800,073,517	-	67,160,987	81,631,229,518	1,215,364,142,048
82	1,215,364,142,048	-	48,599,825	87,504,499,041	1,302,820,041,264
83	1,302,820,041,264	-	34,757,121	93,801,813,461	1,396,587,097,605
84	1,396,587,097,605	-	24,549,193	100,553,402,616	1,497,115,951,028
85	1,497,115,951,028	-	17,108,247	107,791,743,281	1,604,890,586,061
86	1,604,890,586,061	-	11,750,835	115,551,706,519	1,720,430,541,745
87	1,720,430,541,745	-	7,944,834	123,870,717,962	1,844,293,314,874
88	1,844,293,314,874	-	5,280,739	132,788,931,868	1,977,076,966,003
89	1,977,076,966,003	-	3,448,092	142,349,419,578	2,119,422,937,490
90	2,119,422,937,490	-	2,209,995	152,598,373,322	2,272,019,100,817
91	2,272,019,100,817	-	1,388,411	163,585,326,145	2,435,603,038,552
92	2,435,603,038,552	-	853,283	175,363,388,591	2,610,965,573,860
93	2,610,965,573,860	-	510,935	187,989,503,244	2,798,954,566,169
94	2,798,954,566,169	-	295,797	201,524,718,301	3,000,478,988,672
95	3,000,478,988,672	-	163,442	216,034,481,403	3,216,513,306,633
96	3,216,513,306,633	-	84,193	231,588,955,099	3,448,102,177,539
97	3,448,102,177,539	-	38,974	248,263,355,404	3,696,365,493,970
98	3,696,365,493,970	-	16,220	266,138,314,992	3,962,503,792,741
99	3,962,503,792,741	-	6,655	285,300,272,842	4,247,804,058,929
100	4,247,804,058,929	-	3,523	305,841,892,118	4,553,645,947,524

Single Discount Rate Development

Present Values of Projected Benefits Ending December 31, 2117

Year	Projected Beginning Plan Net Position	Projected Benefit Payments Including Dividends	Funded Portion of Benefit Payments	Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments using Expected Return Rate (v)	Present Value of Unfunded Benefit Payments using Municipal Bond Rate (vf)	Present Value of Benefit Payments using Single Discount Rate (sdr)
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v ^{^(a)-.5}	(g)=(e)*vf ^{^(a)-.5}	(h)=(c)/(1+sdr) ^{^(a)-.5}
1	\$ 104,396,462,327	\$ 5,453,105,031	\$ 5,453,105,031	\$ -	\$ 5,266,795,672	\$ -	\$ 5,266,795,672
2	108,241,500,166	5,650,096,863	5,650,096,863	-	5,090,538,369	-	5,090,538,369
3	112,107,082,271	5,858,977,318	5,858,977,318	-	4,924,190,584	-	4,924,190,584
4	115,975,257,197	6,145,383,863	6,145,383,863	-	4,818,005,228	-	4,818,005,228
5	119,741,381,178	6,449,269,474	6,449,269,474	-	4,716,653,682	-	4,716,653,682
6	123,381,832,313	6,717,929,553	6,717,929,553	-	4,583,150,576	-	4,583,150,576
7	126,963,262,744	6,992,027,784	6,992,027,784	-	4,449,764,640	-	4,449,764,640
8	130,475,421,306	7,277,898,790	7,277,898,790	-	4,320,610,549	-	4,320,610,549
9	133,900,175,104	7,565,984,867	7,565,984,867	-	4,189,959,188	-	4,189,959,188
10	137,227,988,024	7,855,455,393	7,855,455,393	-	4,058,082,818	-	4,058,082,818
11	140,449,751,325	8,157,347,534	8,157,347,534	-	3,931,006,112	-	3,931,006,112
12	143,544,061,361	8,460,734,352	8,460,734,352	-	3,803,365,194	-	3,803,365,194
13	146,498,925,750	8,756,728,331	8,756,728,331	-	3,672,037,091	-	3,672,037,091
14	149,310,685,752	9,042,117,527	9,042,117,527	-	3,537,044,675	-	3,537,044,675
15	151,978,827,165	9,319,027,419	9,319,027,419	-	3,400,526,799	-	3,400,526,799
16	154,500,376,695	9,594,678,138	9,594,678,138	-	3,265,962,828	-	3,265,962,828
17	156,864,844,695	9,865,892,292	9,865,892,292	-	3,132,726,000	-	3,132,726,000
18	159,064,435,399	10,129,109,961	10,129,109,961	-	3,000,285,216	-	3,000,285,216
19	161,094,160,448	10,382,048,572	10,382,048,572	-	2,868,662,969	-	2,868,662,969
20	162,951,174,329	10,618,018,100	10,618,018,100	-	2,736,813,143	-	2,736,813,143
21	164,639,605,144	10,837,033,056	10,837,033,056	-	2,605,657,313	-	2,605,657,313
22	166,164,065,906	11,045,142,853	11,045,142,853	-	2,477,327,662	-	2,477,327,662
23	167,523,501,645	11,240,538,063	11,240,538,063	-	2,351,821,899	-	2,351,821,899
24	168,718,960,670	11,419,451,860	11,419,451,860	-	2,228,783,080	-	2,228,783,080
25	169,755,524,461	11,586,841,975	11,586,841,975	-	2,109,564,666	-	2,109,564,666
26	170,633,268,427	11,744,510,951	11,744,510,951	-	1,994,655,554	-	1,994,655,554
27	171,350,135,625	11,892,490,615	11,892,490,615	-	1,884,130,611	-	1,884,130,611
28	171,903,866,308	12,030,178,379	12,030,178,379	-	1,777,933,322	-	1,777,933,322
29	172,293,218,790	12,155,013,561	12,155,013,561	-	1,675,730,078	-	1,675,730,078
30	172,526,446,010	12,263,643,730	12,263,643,730	-	1,577,151,297	-	1,577,151,297
31	172,603,674,809	12,346,994,736	12,346,994,736	-	1,481,222,531	-	1,481,222,531
32	172,543,567,084	12,400,794,500	12,400,794,500	-	1,387,758,103	-	1,387,758,103
33	172,372,159,744	12,423,925,950	12,423,925,950	-	1,296,965,220	-	1,296,965,220
34	172,119,108,345	12,411,436,627	12,411,436,627	-	1,208,639,392	-	1,208,639,392
35	171,821,737,238	12,363,798,266	12,363,798,266	-	1,123,134,623	-	1,123,134,623
36	171,519,498,248	12,283,696,163	12,283,696,163	-	1,040,912,408	-	1,040,912,408
37	171,251,468,932	12,171,880,972	12,171,880,972	-	962,161,625	-	962,161,625
38	171,057,936,504	12,030,416,050	12,030,416,050	-	887,107,388	-	887,107,388
39	170,979,157,498	11,859,769,717	11,859,769,717	-	815,787,450	-	815,787,450
40	171,057,110,267	11,659,429,074	11,659,429,074	-	748,140,668	-	748,140,668
41	171,336,779,656	11,429,816,847	11,429,816,847	-	684,148,634	-	684,148,634
42	171,865,535,692	11,171,522,823	11,171,522,823	-	623,776,178	-	623,776,178
43	172,693,025,768	10,883,650,682	10,883,650,682	-	566,886,633	-	566,886,633
44	173,872,950,709	10,569,016,301	10,569,016,301	-	513,524,779	-	513,524,779
45	175,459,656,724	10,234,836,615	10,234,836,615	-	463,887,816	-	463,887,816
46	177,503,646,544	9,885,452,649	9,885,452,649	-	417,959,140	-	417,959,140
47	180,054,324,982	9,522,174,388	9,522,174,388	-	375,559,379	-	375,559,379
48	183,163,132,411	9,146,857,028	9,146,857,028	-	336,526,746	-	336,526,746
49	186,883,140,916	8,761,226,102	8,761,226,102	-	300,689,179	-	300,689,179
50	191,269,353,212	8,366,559,659	8,366,559,659	-	267,858,256	-	267,858,256

Single Discount Rate Development

Present Values of Projected Benefits Ending December 31, 2117(Concluded)

Year	Projected Beginning Plan Net Position	Projected Benefit Payments Including Dividends	Funded Portion of Benefit Payments	Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments using Expected Return Rate (v)	Present Value of Unfunded Benefit Payments using Municipal Bond Rate (vf)	Present Value of Benefit Payments using Single Discount Rate (sdr)
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v^((a)-.5)	(g)=(e)*vf ^((a)-.5)	(h)=(c)/(1+sdr)^(a-.5)
51	\$ 196,379,344,489	\$ 7,964,319,140	\$ 7,964,319,140	\$ -	\$ 237,854,840	\$ -	\$ 237,854,840
52	202,273,253,426	7,555,742,901	7,555,742,901	-	210,496,910	-	210,496,910
53	209,014,233,302	7,141,923,740	7,141,923,740	-	185,604,703	-	185,604,703
54	216,668,839,051	6,724,335,452	6,724,335,452	-	163,015,295	-	163,015,295
55	225,306,853,251	6,304,783,342	6,304,783,342	-	142,578,606	-	142,578,606
56	235,001,162,403	5,885,028,262	5,885,028,262	-	124,147,496	-	124,147,496
57	245,828,047,330	5,466,766,039	5,466,766,039	-	107,578,409	-	107,578,409
58	257,867,518,925	5,051,910,566	5,051,910,566	-	92,737,524	-	92,737,524
59	271,203,361,808	4,642,574,249	4,642,574,249	-	79,499,412	-	79,499,412
60	285,923,201,663	4,240,986,610	4,240,986,610	-	67,744,988	-	67,744,988
61	302,118,663,520	3,849,434,019	3,849,434,019	-	57,360,426	-	57,360,426
62	319,885,602,131	3,470,232,283	3,470,232,283	-	48,236,884	-	48,236,884
63	339,324,376,065	3,105,649,905	3,105,649,905	-	40,269,702	-	40,269,702
64	360,540,220,957	2,757,793,537	2,757,793,537	-	33,357,453	-	33,357,453
65	383,643,768,234	2,428,563,291	2,428,563,291	-	27,402,221	-	27,402,221
66	408,751,647,461	2,119,598,938	2,119,598,938	-	22,309,778	-	22,309,778
67	435,987,187,751	1,832,210,042	1,832,210,042	-	17,989,622	-	17,989,622
68	465,481,242,027	1,567,398,104	1,567,398,104	-	14,355,929	-	14,355,929
69	497,373,047,693	1,325,907,968	1,325,907,968	-	11,328,452	-	11,328,452
70	531,811,096,055	1,108,223,208	1,108,223,208	-	8,832,622	-	8,832,622
71	568,954,069,111	914,551,719	914,551,719	-	6,799,483	-	6,799,483
72	608,971,858,716	744,787,864	744,787,864	-	5,165,418	-	5,165,418
73	652,046,698,309	598,413,690	598,413,690	-	3,871,503	-	3,871,503
74	698,374,478,415	474,426,530	474,426,530	-	2,863,204	-	2,863,204
75	748,166,231,810	371,319,038	371,319,038	-	2,090,430	-	2,090,430
76	801,649,746,301	287,100,023	287,100,023	-	1,507,742	-	1,507,742
77	859,071,272,041	219,434,968	219,434,968	-	1,074,991	-	1,074,991
78	920,697,206,296	165,873,667	165,873,667	-	758,022	-	758,022
79	986,815,663,812	124,043,772	124,043,772	-	528,791	-	528,791
80	1,057,737,959,870	91,773,054	91,773,054	-	364,947	-	364,947
81	1,133,800,073,517	67,160,987	67,160,987	-	249,136	-	249,136
82	1,215,364,142,048	48,599,825	48,599,825	-	168,174	-	168,174
83	1,302,820,041,264	34,757,121	34,757,121	-	112,195	-	112,195
84	1,396,587,097,605	24,549,193	24,549,193	-	73,922	-	73,922
85	1,497,115,951,028	17,108,247	17,108,247	-	48,056	-	48,056
86	1,604,890,586,061	11,750,835	11,750,835	-	30,790	-	30,790
87	1,720,430,541,745	7,944,834	7,944,834	-	19,419	-	19,419
88	1,844,293,314,874	5,280,739	5,280,739	-	12,041	-	12,041
89	1,977,076,966,003	3,448,092	3,448,092	-	7,334	-	7,334
90	2,119,422,937,490	2,209,995	2,209,995	-	4,385	-	4,385
91	2,272,019,100,817	1,388,411	1,388,411	-	2,570	-	2,570
92	2,435,603,038,552	853,283	853,283	-	1,473	-	1,473
93	2,610,965,573,860	510,935	510,935	-	823	-	823
94	2,798,954,566,169	295,797	295,797	-	444	-	444
95	3,000,478,988,672	163,442	163,442	-	229	-	229
96	3,216,513,306,633	84,193	84,193	-	110	-	110
97	3,448,102,177,539	38,974	38,974	-	48	-	48
98	3,696,365,493,970	16,220	16,220	-	18	-	18
99	3,962,503,792,741	6,655	6,655	-	7	-	7
100	4,247,804,058,929	3,523	3,523	-	3	-	3
Totals					\$ 117,670,039,946	\$ -	\$ 117,670,039,946

SECTION F

SUMMARY OF ASSUMPTIONS

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

Economic Assumptions

In determining plan liabilities for accounting purposes, a discount rate of 7.2% is used for both actives and retirees. However, a long term assumed dividend of 2.1% 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 7.2% 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: 1.8% Core, 2.1% Variable
- 2020: 2.0% Core, 2.1% Variable
- 2021: 3.3% Core, 2.1% Variable
- 2022: 3.2% Core, 2.1% Variable
- 2023 and later: 2.1% Core, 2.1% Variable

The **Wage Inflation Rate** assumed in this valuation was 3.20% per year. The wage inflation rate is defined to be the portion of total pay increases for an individual that are due to macro-economic forces including productivity, price inflation, and labor market conditions. The wage inflation rate does not include pay changes rated to individual merit and seniority effects.

No specific **Price Inflation** assumption is required to perform this valuation. The price inflation assumption used to evaluate the investment return assumption is 2.7%.

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 7.2% 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 is 4.5% considering an inflation assumption of 2.7%.

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 3.2% recognizes wage inflation, including price inflation, productivity increases, and other macro-economic forces.

Service	% Merit and Longevity Increase Next Year					
	Gen.	University Teachers	Public School Teachers	Protective		Exec. & Elec.
				With S.S.	W/O S.S.	
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 2012 Mortality Table. The rates in this table were based on actual WRS experience adjusted for future mortality improvements using the MP-2015 fully generational improvement scale (multiplied by 50%). This mortality assumption was adopted by the Board in connection with the 2012-2014 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 2012 Mortality Table with 5% Interest

Sample Attained Ages in 2017	Present Value of \$1 Monthly for Life*		Future Life Expectancy (years)*		Mortality Rates*	
	Males	Females	Males	Females	Males	Females
40	\$212.26	\$217.36	44.7	47.9	0.000948	0.000590
45	203.68	209.93	39.7	42.8	0.001247	0.000914
50	192.96	200.73	34.7	37.8	0.001684	0.001357
55	180.13	189.56	29.9	32.9	0.003963	0.002431
60	165.76	176.25	25.3	28.2	0.005668	0.003490
65	148.55	160.13	20.9	23.5	0.008629	0.005295
70	129.00	141.01	16.7	19.0	0.014193	0.008956
75	107.29	119.37	12.8	14.8	0.024118	0.016265
80	84.55	96.13	9.4	11.0	0.044374	0.030495
85	63.32	73.03	6.5	7.8	0.082894	0.061073

* Based on data in 2017. Future years will reflect improvements in mortality.

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)		Mortality Rates*	
	Males	Females	Males	Females	Males	Females
40	\$198.79	\$207.55	37.2	41.5	0.000963	0.000599
45	186.85	197.77	32.3	36.5	0.001266	0.000928
50	173.07	185.91	27.5	31.6	0.001710	0.001378
55	157.06	171.77	23.0	26.8	0.004022	0.002492
60	138.40	154.89	18.6	22.2	0.005871	0.003669
65	117.92	135.14	14.6	17.8	0.009167	0.005624
70	95.73	113.02	11.0	13.7	0.015308	0.009513
75	73.46	89.53	7.9	10.1	0.026012	0.017277
80	53.99	67.03	5.4	7.0	0.047857	0.032392
85	38.26	48.95	3.7	4.9	0.089402	0.064873

* Based on data in 2017. Future years will reflect improvements in mortality.

Active Participant Mortality Rates

Sample Attained Ages in 2017	Mortality Rates*	
	Males	Females
20	0.000132	0.000077
25	0.000159	0.000085
30	0.000201	0.000117
35	0.000353	0.000210
40	0.000474	0.000295
45	0.000624	0.000457
50	0.000842	0.000679
55	0.001982	0.001216
60	0.002834	0.001745
65	0.004315	0.002648
70	0.007097	0.004478
75	0.012059	0.008133
80	0.022187	0.015248

** Based on data in 2017. Future years will reflect improvements in mortality.*

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%	4%	
51							7%	4%	
52							9%	5%	
53							23%	17%	
54							19%	25%	
55							19%	21%	
56							19%	27%	
57	18%	15%	36%	28%	12%	14%	19%	30%	12%
58	18%	15%	31%	28%	12%	12%	18%	30%	12%
59	18%	15%	24%	28%	12%	10%	16%	30%	12%
60	18%	15%	30%	28%	12%	12%	20%	26%	12%
61	18%	15%	28%	28%	12%	16%	20%	15%	12%
62	25%	25%	37%	36%	12%	14%	22%	20%	12%
63	30%	25%	32%	30%	12%	19%	26%	40%	12%
64	25%	25%	27%	27%	12%	13%	17%	40%	12%
65	25%	28%	29%	35%	15%	18%	30%	40%	12%
66	32%	32%	33%	35%	17%	22%	25%	40%	20%
67	26%	26%	27%	30%	16%	17%	30%	40%	15%
68	19%	22%	24%	30%	16%	16%	30%	40%	15%
69	19%	20%	24%	30%	16%	14%	30%	40%	10%
70	19%	20%	20%	35%	16%	18%	100%	100%	10%
71	19%	20%	20%	30%	18%	18%	100%	100%	10%
72	19%	20%	20%	22%	14%	18%	100%	100%	15%
73	19%	20%	20%	22%	14%	18%	100%	100%	15%
74	19%	20%	20%	22%	10%	18%	100%	100%	15%
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						Exec. & Elected
	General		Public School		University		
	Male	Female	Male	Female	Male	Female	
55	9.0%	7.0%	13.0%	12.0%	4.0%	5.5%	3.0%
56	9.0%	7.0%	13.0%	12.0%	3.0%	5.5%	3.0%
57	4.8%	5.0%	12.0%	12.0%	2.5%	4.0%	3.0%
58	5.8%	6.0%	13.0%	12.0%	2.5%	5.5%	3.0%
59	6.5%	6.0%	14.0%	13.0%	3.0%	6.5%	3.0%
60	8.5%	8.5%	14.0%	17.0%	4.3%	8.0%	5.0%
61	8.5%	8.5%	15.0%	17.0%	5.0%	6.0%	5.0%
62	16.0%	16.0%	21.0%	23.0%	6.0%	12.0%	
63	17.0%	16.0%	21.0%	23.0%	7.0%	12.0%	
64	17.0%	16.0%	21.0%	23.0%	7.0%	12.0%	

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	17.0%	4.0%	18.3%	16.0%	16.0%	16.0%	18.0%	16.8%	20.0%
	1	8.0%	3.5%	11.0%	10.8%	14.0%	15.0%	14.0%	12.7%	14.1%
	2	5.0%	1.5%	7.8%	7.7%	12.0%	13.0%	12.0%	9.0%	11.0%
	3	4.3%	1.3%	5.9%	5.8%	10.0%	10.0%	10.0%	7.3%	8.9%
	4	3.8%	1.2%	4.9%	5.0%	8.5%	9.9%	10.0%	7.0%	8.5%
	5	3.1%	1.1%	3.6%	4.3%	8.0%	8.4%	8.0%	4.8%	6.7%
	6	3.0%	1.0%	3.2%	3.8%	7.5%	6.4%	7.0%	4.3%	5.6%
	7	2.9%	0.9%	2.6%	3.4%	5.7%	5.7%	6.0%	4.2%	5.0%
	8	2.5%	0.8%	2.6%	2.8%	4.6%	4.7%	6.0%	3.4%	4.7%
	9	2.2%	0.7%	2.4%	2.5%	4.0%	4.2%	6.0%	3.1%	4.5%
25	10 & Over	2.0%	0.7%	1.3%	2.2%	4.0%	5.0%	6.0%	2.5%	4.5%
30		1.8%	0.7%	1.3%	1.9%	3.9%	4.6%	5.1%	2.5%	4.3%
35		1.6%	0.7%	1.3%	1.6%	3.6%	4.2%	4.3%	2.4%	3.5%
40		1.3%	0.6%	1.3%	1.3%	3.1%	3.4%	4.1%	2.1%	2.7%
45		1.1%	0.6%	1.3%	1.1%	2.3%	2.6%	3.2%	1.8%	2.2%
50		1.0%	0.5%	1.3%	1.0%	1.9%	2.1%	2.5%	1.5%	1.9%
55		1.0%	0.5%	1.3%	1.0%	1.8%	2.0%	2.4%	1.5%	1.8%
60		1.0%	0.5%	1.3%	1.0%	1.8%	2.0%	2.4%	1.5%	1.8%

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%	0.04%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%
25	0.01%	0.04%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%
30	0.01%	0.04%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.01%	0.02%
35	0.02%	0.04%	0.01%	0.01%	0.00%	0.02%	0.01%	0.01%	0.01%	0.03%
40	0.02%	0.06%	0.01%	0.02%	0.01%	0.03%	0.01%	0.01%	0.03%	0.04%
45	0.03%	0.11%	0.03%	0.05%	0.01%	0.03%	0.01%	0.01%	0.06%	0.06%
50	0.06%	0.64%	0.08%	0.10%	0.02%	0.06%	0.02%	0.02%	0.13%	0.09%
55	0.87%	0.48%	0.16%	0.14%	0.05%	0.09%	0.09%	0.09%	0.24%	0.16%
60	1.46%	0.14%	0.26%	0.21%	0.07%	0.13%	0.11%	0.11%	0.43%	0.23%

SECTION G

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	
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.

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.

	Pre-10/16/92 WRS Plan	Post-10/15/92 LTDI Plan
Participants covered	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.
Benefit to age 65*	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.
Benefit at age 65*	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.

Death-in-Service.

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

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

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

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

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

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

General	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

GLOSSARY OF TERMS

Glossary of Terms

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

Glossary of Terms

<i>Amortization Payment</i>	The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.
<i>Amortization Method</i>	The method used to determine the periodic amortization payment may be a level dollar amount, or a level percent of pay amount. The period will typically be expressed in years, and the method will either be “open” (meaning, reset each year) or “closed” (the number of years remaining will decline each year).
<i>Cost-of-Living Adjustments</i>	Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.
<i>Cost-Sharing Multiple-Employer Defined Benefit Pension Plan (cost-sharing pension plan)</i>	A multiple-employer defined benefit pension plan in which the pension obligations to the employees of more than one employer are pooled and pension plan assets can be used to pay the benefits of the employees of any employer that provides pensions through the pension plan.
<i>Covered-Employee Payroll</i>	The payroll of covered employees, which is typically only the pensionable pay and does not include pay above any pay cap.
<i>Deferred Retirement Option Program (DROP)</i>	A program that permits a plan member to elect a calculation of benefit payments based on service credits and salary, as applicable, as of the DROP entry date. The plan member continues to provide service to the employer and is paid for the service by the employer after the DROP entry date; however, the pensions that would have been paid to the plan member are credited to an individual member account within the defined benefit pension plan until the end of the DROP period. Other variations for DROP exist and will be more fully detailed in the plan provision section of the valuation report.
<i>Deferred Inflows and Outflows</i>	The deferred inflows and outflows of pension resources are amounts used under GASB Statement No. 68 in developing the annual pension expense. Deferred inflows and outflows arise with differences between expected and actual experiences; changes of assumptions. The portion of these amounts not included in pension expense should be included in the deferred inflows or outflows of resources.
<i>Discount Rate</i>	For GASB purposes, the discount rate is the single rate of return that results in the present value of all projected benefit payments to be equal to the sum of the funded and unfunded projected benefit payments, specifically: <ol style="list-style-type: none">1. The benefit payments to be made while the pension plans’ fiduciary net position is projected to be greater than the benefit payments that are projected to be made in the period and;2. The present value of the benefit payments not in (1) above, discounted using the municipal bond rate.

Glossary of Terms

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

Glossary of Terms

<i>Other Postemployment Benefits (OPEB)</i>	All postemployment benefits other than retirement income (such as death benefits, life insurance, disability, and long-term care) that are provided separately from a pension plan, as well as postemployment healthcare benefits regardless of the manner in which they are provided. Other post-employment benefits do not include termination benefits.
<i>Real Rate of Return</i>	The real rate of return is the rate of return on an investment after adjustment to eliminate inflation.
<i>Service Cost</i>	The service cost is the portion of the actuarial present value of projected benefit payments that is attributed to a valuation year.
<i>Total Pension Expense</i>	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">1. Service Cost2. Interest on the Total Pension Liability3. Current-Period Benefit Changes4. Employee Contributions (made negative for addition here)5. Projected Earnings on Plan Investments (made negative for addition here)6. Pension Plan Administrative Expense7. Other Changes in Plan Fiduciary Net Position8. Recognition of Outflow (Inflow) of Resources due to Liabilities9. Recognition of Outflow (Inflow) of Resources due to Assets
<i>Total Pension Liability (TPL)</i>	The TPL is the portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service.
<i>Unfunded Actuarial Accrued Liability (UAAL)</i>	The UAAL is the difference between actuarial accrued liability and valuation assets.
<i>Valuation Assets</i>	The valuation assets are the assets used in determining the unfunded liability of the plan. For purposes of the GASB Statement No. 67, the valuation asset is equal to the market value of assets.