



OREGON PUBLIC EMPLOYEES RETIREMENT SYSTEM

TIER 1/TIER 2 AND OPSRP PENSION BENEFITS RHA/RHIPA RETIREE MEDICAL BENEFITS

December 31, 2016 Actuarial Valuation

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December 6, 2017

Retirement Board
Oregon Public Employees Retirement System

Dear Members of the Board,

As part of our engagement with the Board, we performed an actuarial valuation of the Oregon Public Employees Retirement System ("PERS" or "the System") as of December 31, 2016. Our findings are set forth in this actuarial valuation report. This report reflects the benefit provisions in effect as of December 31, 2016.

In preparing this report, we relied, without audit, on information (some oral and some in writing) supplied by the System's staff. This information includes, but is not limited to, System benefit provisions as defined by statute, member census data, and financial information. We found this information to be reasonably consistent and comparable with information used for other purposes. The valuation results depend on the integrity of this information. If any of this information is inaccurate or incomplete our results may be different and our calculations may need to be revised.

All costs, liabilities, rates of interest, and other factors for the System have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of the System and reasonable expectations); and which, in combination, offer a reasonable estimate of anticipated experience affecting the System.

This valuation report is only an estimate of the System's financial condition as of a single date. It can neither predict the System's future condition nor guarantee future financial soundness. Actuarial valuations do not affect the ultimate cost of System benefits, only the timing of System contributions. While the valuation is based on an array of individually reasonable assumptions, other assumption sets may also be reasonable and valuation results based on those assumptions would be different. No one set of assumptions is uniquely correct.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: System experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the System's funded status); and changes in System benefit provisions or applicable law. Due to the limited scope of this assignment, we did not perform an analysis of the potential range of future measurements. The Board has the final decision regarding the appropriateness of the assumptions and adopted them as indicated herein in July 2017.



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Some of the actuarial computations presented in this report are for purposes of determining the advisory July 2019 to June 2021 contribution rates for System employers. Other actuarial computations presented in this report are for purposes of assisting the System and participating employers in fulfilling their financial reporting requirements. The computations prepared for these two purposes may differ as disclosed in our report. The calculations in the enclosed report have been made on a basis consistent with our understanding of the System's funding requirements and goals. The calculations in this report have been made on a basis consistent with our understanding of the System benefit provisions as summarized in this report. This report does not include results determined under GASB Statements Nos. 67 and 68, or under GASB Statements Nos. 74 and 75, which will be provided separately. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes.

Milliman's work is prepared solely for the use and benefit of the Oregon Public Employees Retirement System.

Milliman does not intend to benefit or create a legal duty to any third party recipient of this report. No third party recipient of Milliman's work product should rely upon this report. Such recipients should engage qualified professionals for advice appropriate to their own specific needs.

The consultants who worked on this assignment are actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel.

The signing actuaries are independent of the System. We are not aware of any relationship that would impair the objectivity of our work.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices. We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein.

Sincerely,



Matt Larrabee, FSA, EA, MAAA
Principal and Consulting Actuary



Scott Preppernau, FSA, EA, MAAA
Principal and Consulting Actuary



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Executive Summary

Executive Summary

Milliman prepared this report for the Oregon Public Employees Retirement System to:

- Present Milliman's actuarial estimates of the system-wide liabilities and expenses of the Oregon Public Employees Retirement System (PERS), including pension benefits provided through Tier 1/Tier 2 and the Oregon Public Service Retirement Plan (OPSRP), and retiree medical benefits provided through the Retiree Health Insurance Account (RHIA) and the Retiree Health Insurance Premium Account (RHIPA), as of December 31, 2016 for PERS to incorporate, as PERS deems appropriate, in its financial statements; and
- Provide information on advisory system-wide average employer contribution rates and employer contribution rates for the School District rate pool and the State and Local Government Rate Pool (SLGRP) calculated as of December 31, 2016.

This valuation does not cover the defined contribution Individual Account Program (IAP). Except where otherwise explicitly noted, contribution rates in this valuation do not include contributions to the IAP. In addition, the valuation does not include an allowance for employer debt service payments on pension obligation bonds.

Summarizing a key result of this report, this advisory valuation indicates that the system-average collared "net" employer contribution rate for the 2019-2021 biennium may increase by more than 5.5% of payroll compared to the rate currently in effect for the 2017-2019 biennium. This increase reflects continued scheduled rate increases to reflect the 2015 Oregon Supreme Court ruling in *Moro v. State of Oregon*, along with rate increases resulting from actual investment results and updates to valuation assumptions. Further discussion and explanation of the change in collared rates can be found in our September 2017 presentation materials to the PERS Board. Actual contribution rates for the 2019-2021 biennium will be determined by the December 31, 2017 valuation, and will reflect plan experience through that date.

Of concern, even with the advisory rate increase noted above the system-average uncollared employer contribution rate remains more than 5% of payroll above the advisory collared rate for 2019-2021. Because of this, if actual experience is near assumption we anticipate system-average collared rate increases similar to the increase calculated in this valuation not only for the 2019-2021 biennium, but also for the 2021-2023 biennium. In the event that long-term future experience mirrors the valuation assumptions, these increases are needed to allow the system's unfunded liability to be systematically amortized over time by a combination of employer contributions and actual investment earnings. For more information on projections of future rate increases, we encourage readers of this report to review our financial modeling presentations to the PERS Board. The most recent such presentation was given in November 2016, and our next presentation will be at the December 2017 PERS Board meeting.

Projected Benefit Payments and the Fundamental Cost Equation

The actuarial liabilities contained in this report are calculated from a projection of benefit payments. This projection reflects the current plan provisions, assumptions, and demographic information documented herein. The stream of projected future benefit payments is converted to a net present value as of the valuation date based on the valuation's investment return assumption, which currently is 7.20%. The total net present value is then assigned to past, present, and future service according to the actuarial cost method. The portion assigned to the past is called the **actuarial accrued liability**¹, while the portion assigned to the current year is referred to as the **normal cost**.

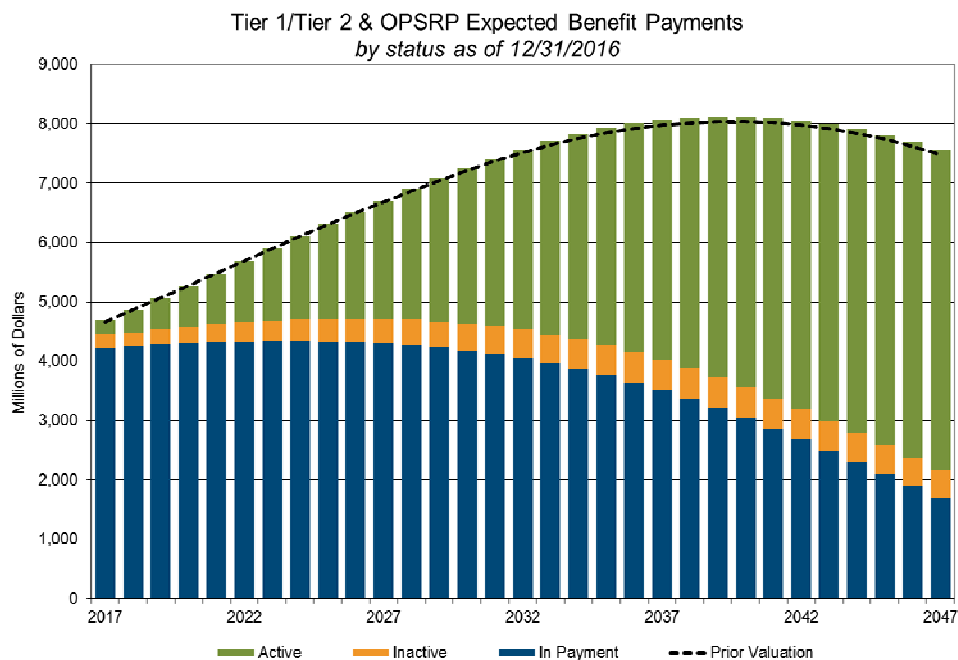
¹ *Bolded terms from the Executive Summary are defined in the report glossary.*

Actuarial valuations provide a tool for measuring a System’s progress towards funding its benefit obligations and adjusting budgeted contributions as appropriate to reflect changing circumstances. Even though they affect actuarial funded status and contribution rate calculations, assumptions regarding plan investment returns and participant experience do not affect the ultimate long-term cost of the program, which is governed by the **fundamental cost equation**:

$$\text{Benefits} + \text{Expenses} = \text{Contributions} + \text{Investment Earnings}$$

From a plan funding perspective, contributions are the balancing item in the equation. To the extent actual plan investment earnings underperform compared to assumption, contributions must increase to fund the defined level of benefits; if investments outperform the assumption, contributions can decrease.

The graph below illustrates projected benefit payments from the System calculated in both the current valuation and the prior valuation, organized by member status as of the actuarial valuation date. The graph includes the estimated effects on projected benefits of anticipated future service by current active members, including the assumed effects of future salary increases. The graph does not include expected benefit payments for members hired after the valuation date. The dotted line illustrates the shape of the graph from the prior valuation, which was performed as of December 31, 2015. As shown in the graph, there was little change in the projected benefits calculated in the current valuation.



Employer Contribution Rates

Pension Contribution Rates

This report presents system average employer contribution rates calculated as of December 31, 2016. These rates are advisory only. The December 31, 2017 valuation will determine employer contribution rates that will be presented for PERS Board adoption to be first effective July 1, 2019. The December 31, 2015 valuation presented the employer contribution rates that were adopted by the PERS Board for July 1, 2017 through June 30, 2019.

Employer pension contribution rates consist of a normal cost rate and a rate to amortize the Unfunded Accrued Liability (UAL). Normal cost rates are calculated and charged separately to the Tier 1/Tier 2, OPSRP general service and OPSRP police and fire payrolls. UAL rates are calculated separately for Tier 1/Tier 2 and OPSRP, but each UAL rate so developed is then charged across all payrolls. Rates for individual employers are adjusted if the employer maintains a side account or has a **pre-SLGRP liability or surplus**. The table below compares the average employer contribution rates for each type of payroll calculated for this valuation to the rates in effect from July 1, 2017 through June 30, 2019.

Collared Pension Contribution Rates (Excludes IAP)						
Payroll	Advisory July 1, 2019			Effective July 1, 2017		
	Tier 1/Tier 2	OPSRP General Service	OPSRP Police & Fire	Tier 1/Tier 2	OPSRP General Service	OPSRP Police & Fire
Normal Cost Rate	15.44%	8.49%	13.22%	15.07%	8.02%	12.79%
Tier 1/Tier 2 UAL Rate ¹	12.65%	12.65%	12.65%	7.79%	7.79%	7.79%
OPSRP UAL Rate	1.56%	1.56%	1.56%	1.27%	1.27%	1.27%
Total Pension Rate	29.65%	22.70%	27.43%	24.13%	17.08%	21.85%
Average Adjustment ²	(6.42%)	(6.42%)	(6.42%)	(6.62%)	(6.62%)	(6.62%)
Net Pension Rate	23.23%	16.28%	21.01%	17.51%	10.46%	15.23%

1. Includes Multnomah Fire District #10

2. Adjustments shown are for side accounts and pre-SLGRP liabilities and are shown on system-wide average basis. For this purpose, adjustments are not assumed to be limited when an individual employer reaches a 0% contribution rate.

Average normal cost and collared UAL rates calculated in this valuation both increased compared to the contribution rates calculated in the December 31, 2015 valuation, which produced rates effective July 1, 2017. This is primarily due to continued recognition of collared UAL rate increases, along with the effect of a lower investment return assumption.

Pension contribution rates differ for each Tier 1/Tier 2 rate pool. This report calculates the specific rates for each rate pool. Tier 1/Tier 2 rates for independent employers (employers that do not participate in a Tier 1/Tier 2 rate pool) are calculated in separate reports for each employer. Changes from biennium to biennium in pension contribution rates for each rate pool (or independent employer) are confined to a **rate collar** depending on **funded status**. The table below shows the employer pension contribution rates for each Tier 1/Tier 2 rate pool calculated in this valuation compared to the rates in effect as of July 1, 2017, along with the average adjustment to those rates for side account rate offsets and for pre-SLGRP and transition liability charges and credits.

Tier 1/Tier 2 Collared Pension Contribution Rates (Excludes IAP)				
	Advisory July 1, 2019		Effective July 1, 2017	
	SLGRP	School Districts	SLGRP	School Districts
Normal Cost Rate	15.96%	14.04%	15.78%	13.28%
Tier 1/Tier 2 UAL Rate ¹	10.74%	17.50%	6.10%	12.15%
Total Pension Rate	26.70%	31.54%	21.88%	25.43%
Average Adjustment ²	(5.38%)	(9.80%)	(5.52%)	(10.26%)
Net Pension Rate	21.32%	21.74%	16.36%	15.17%

1. Includes Multnomah Fire District #10

2. Adjustments shown are for side accounts and pre-SLGRP liabilities and are shown on a rate pool average basis. For this purpose, adjustments are not assumed to be limited when an individual employer reaches a 0% contribution rate.

The Tier 1/Tier 2 contribution rates shown here are after reflecting the effects of the rate collar. Due to the impact of the *Moro* decision and assumption changes (primarily lower investment return), both the SLGRP and the School District rate pool have “before collar” (or “uncollared”) contribution rates that exceed the maximum single biennium rate increase allowed by the collar. The impact of the collar adjustment for each rate pool is shown below. The contribution rate increases deferred by the rate collar will be reflected in future rate-setting periods. In other words, if all actual future experience matches or is near the assumptions in this valuation, in addition to the increases effective for the July 1, 2019 to June 30, 2021 biennium illustrated in this report on an advisory basis, we would expect additional increases in the July 1, 2021 to June 30, 2023 biennium. As already noted previously in the table above, the “average adjustment” in the table below quantifies the effects of side accounts and pre-SLGRP liabilities on a rate pool average basis.

Collar Impact on Tier 1/Tier 2 Pension Contribution Rates		
Advisory July 1, 2019		
	SLGRP	School Districts
Total Pension Rate Before Collar	32.28%	35.49%
Collar Adjustment	(5.58%)	(3.95%)
Total Pension Rate After Collar	26.70%	31.54%
Average Adjustment	(5.38%)	(9.80%)
Net Pension Rate	21.32%	21.74%

Retiree Healthcare Contribution Rates

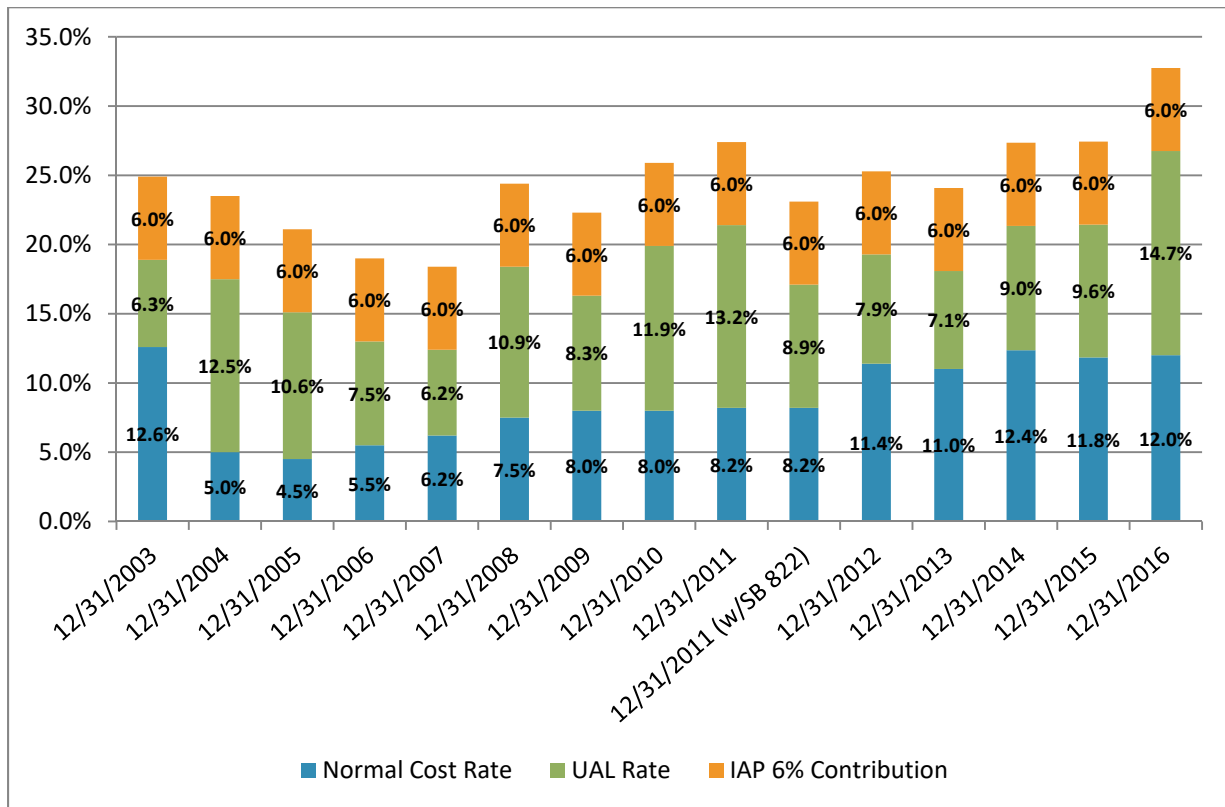
In addition to the pension contribution rates, all employers contribute to the Retirement Health Insurance Account (RHIA). Further, State Agencies and State Judiciary also contribute to the Retiree Health Insurance Premium Account (RHIPA). Only Tier 1 and Tier 2 members are eligible for these benefits, so the normal cost rates are only charged to Tier 1/Tier 2 payroll, but the UAL rates are charged to all payrolls. For each type of payroll used in this valuation the table below compares the employer contribution rates calculated in this valuation to the rates in effect from July 1, 2017 through June 30, 2019. The funded status for both retiree healthcare programs has historically lagged those of the defined benefit pension programs. In response to this, the UAL on the retiree healthcare programs is amortized over a ten-year period, which is shorter than the pension program amortization periods, in an effort to more rapidly improve funded status. Funded status for both programs have materially improved since the amortization change was implemented, with the larger RHIA program reaching 100% funded status in this valuation.

Retiree Healthcare Contribution Rates						
Payroll	Advisory July 1, 2019			Effective July 1, 2017		
	Tier 1/Tier 2	OPSRP General Service	OPSRP Police & Fire	Tier 1/Tier 2	OPSRP General Service	OPSRP Police & Fire
RHIA Normal Cost Rate	0.07%	0.00%	0.00%	0.07%	0.00%	0.00%
RHIA UAL Rate	0.42%	0.42%	0.42%	0.43%	0.43%	0.43%
Total RHIA rate	0.49%	0.42%	0.42%	0.50%	0.43%	0.43%
RHIPA Normal Cost Rate	0.12%	0.00%	0.00%	0.11%	0.00%	0.00%
RHIPA UAL Rate	0.38%	0.38%	0.38%	0.38%	0.38%	0.38%
Total RHIPA rate	0.50%	0.38%	0.38%	0.49%	0.38%	0.38%

Combined Pension and Retiree Healthcare Contribution Rates

The system-wide average combined pension and retiree healthcare contribution rates are shown below for each valuation since December 31, 2003. As shown below, the average normal cost rate declined dramatically after the 2003 valuation, primarily due to the change in the actuarial cost method from entry age normal (EAN) to projected unit credit (PUC) made in the December 31, 2004 valuation. The PUC method allocates benefits projected to be paid under the Money Match formula to past service with a 0% normal cost allocation to current year service. As additional long-service Tier 1 members retired under the Money Match formula, the normal cost rate gradually increased over the subsequent valuations. A change back to EAN in the December 31, 2012 valuation increased the normal cost rate, as the EAN method allocates a portion of benefits projected to be paid under the Money Match formula to current year service. The system-wide average normal cost rate is now expected to drift down gradually in the future toward the OPSRP normal cost rate (currently 9.03%) as new OPSRP members replace retiring Tier 1 and Tier 2 members. The OPSRP normal cost rate is expected to increase slowly over time due to anticipated improvements in life expectancy. The average normal cost and UAL rates have increased since the prior valuation as of December 31, 2015, primarily due to the effects of continued recognition of collared UAL rate increases and the change to the investment return assumption.

System-Wide Average Collared Base Contribution Rates – Combined Pension and Retiree Healthcare



For an individual employer, base pension rates are adjusted for side accounts rate offsets to develop net pension rates paid by the employer. Side accounts are the result of employer supplemental deposits, typically financed through a pension obligation bond. When a supplemental deposit is made, a side account is established (after any transition liabilities related to joining the SLGRP have been paid) and used to offset the otherwise required contribution. As of December 31, 2016, the system has approximately \$5.4 billion in unamortized side accounts, slightly lower than last year. At a system-average level, side accounts now reduce employer contribution rates by 5.99% of payroll, but there is wide variation between employers.

For individual employers in the SLGRP, the rates shown above are also adjusted for amortization payments on pre-SLGRP liabilities. The average adjustment to individual employer rates due to side accounts and pre-SLGRP liabilities is shown on a combined basis in the table on page 4.

Limits on Future Pension Contribution Rates

The minimum and maximum rates that can be effective July 1, 2019 for each Tier 1/Tier 2 rate pool (prior to adjustments) are shown in the table below. The limits are calculated and applied on an individual employer basis for independent employers. The contribution rates for individual pooled employers are adjusted from the rates of the pool to reflect side account rate offsets, charges or credits for pre-SLGRP liabilities, and adjustments to the normal cost rates of SLGRP employers to reflect the employer’s ratio of general service to police and fire payroll. These adjustments are not limited by the rate collar.

The size of the rate collar depends on the funded status of a rate pool or employer. When funded status is less than 60 percent or above 140 percent, the size of the rate collar is twice the size of the “single collar” that applies when funded status is between 70 percent and 130 percent. The rate collar provides a graded

schedule between the single and double rate collars if the funded status, excluding side accounts, is between 60% and 70% or 130% and 140%.

	Limits on Future Pension Contribution Rates	
	Effective July 1, 2019	
	Tier 1/Tier 2	
	SLGRP	School Districts
Between 70% and 130% Funded		
Minimum Rate	17.50%	20.34%
Maximum Rate	26.26%	30.52%
Less than 60% or Greater than 140% Funded		
Minimum Rate	13.12%	15.25%
Maximum Rate	30.64%	35.61%

For Rate Pools funded between 60% and 70% or between 130% and 140% the limits vary linearly between the rates shown above.

Funded Status

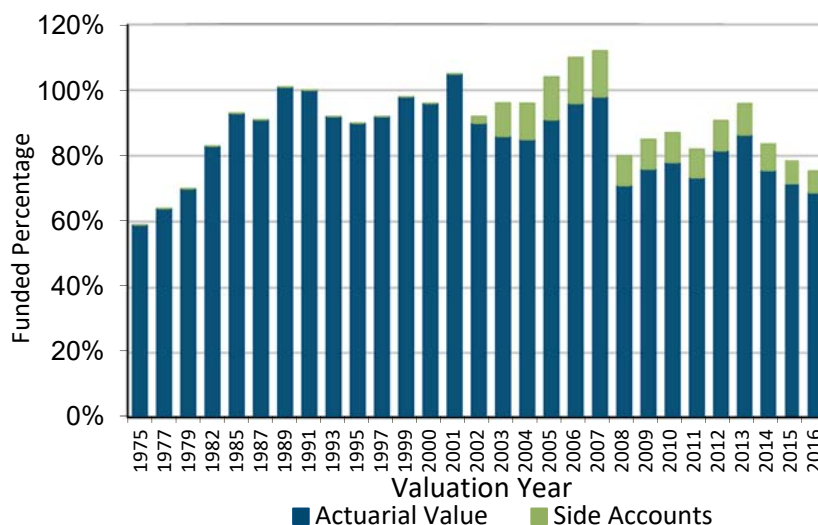
The table below shows the funded status of the various pension rate pools both on the basis used to calculate the contribution rate for each rate pool and after adjustment for side accounts (assuming side accounts offset Tier 1/Tier 2 liabilities). For this exhibit, all independent employers, including State Judiciary, have been grouped together.

	SLGRP	School Districts	Independent Employers	OPSRP	Pension System Totals ¹
December 31, 2016					
Actuarial accrued liability	\$40,351.3	\$29,152.2	\$6,690.8	\$4,717.0	\$80,970.3
Actuarial value of assets	\$28,032.6	\$19,952.9	\$4,770.0	\$3,021.4	\$55,670.2
Funded status	69.5%	68.4%	71.3%	64.1%	68.8%
Side accounts	\$2,385.0	\$2,917.2	\$86.6	\$0.0	\$5,388.8
Funded status reflecting side accounts	75.4%	78.5%	72.6%	64.1%	75.4%
December 31, 2015					
Actuarial accrued liability	\$38,396.8	\$27,670.7	\$6,327.1	\$3,742.5	\$76,196.6
Actuarial value of assets	\$27,682.7	\$19,687.3	\$4,717.5	\$2,389.1	\$54,365.8
Funded status	72.1%	71.1%	74.6%	63.8%	71.3%
Side accounts	\$2,502.6	\$3,041.6	\$90.1	\$0.0	\$5,634.3
Funded status reflecting side accounts	78.6%	82.1%	76.0%	63.8%	78.7%

Amounts in millions

¹ Includes Multnomah Fire District #10

As shown in the graph below, the funded status of the system generally improved until the market decline of 2000-2002. Funded status generally improved for several years due to better than expected investment returns until 2008, when it decreased significantly due to investment losses. The funded status improved through the December 31, 2013 valuation due to legislative changes in plan provisions and investment gains during 2012 and 2013. The funded status declined in the December 31, 2014 valuation due to the combined effects of the *Moro* decision and assumption changes, and decreased further in the most recent valuations due to combined effects of investment losses and adoption of a lower assumed rate of return.



The retiree medical benefits are funded using a 401(h) account within the pension trust. The table below shows the funded status of the retiree medical programs. The funded status of the RHIA and RHIPA programs improved since the prior valuation due primarily to employer contributions.

	December 31, 2016			December 31, 2015		
	RHIA	RHIPA	Total	RHIA	RHIPA	Total
Actuarial accrued liability	\$463.7	\$67.9	\$531.6	\$465.6	\$67.8	\$533.4
Actuarial value of assets	\$465.0	\$19.1	\$484.1	\$419.3	\$11.2	\$430.5
Funded status	100.3%	28.1%	91.1%	90.0%	16.5%	80.7%

Amounts in millions

Asset Changes

Since December 31, 2015, contributions (including supplemental deposits but excluding side account rate offset transfers) for pension benefits have increased assets by 1.7% while benefit payments decreased assets by about 6.9%. On the whole, assets increased by 1.7%, since the investment returns of approximately 6.9% were enough to offset the system’s negative cash flow position.

All Reserves	Amount	Percentage of 12/31/2015 Market Value
Market value, December 31, 2015	\$62,204.6	
Contributions	1,049.3	1.7%
Investment Income	4,278.9	6.9%
Benefit Payments	(4,300.6)	(6.9%)
Market value, December 31, 2016	\$63,232.2	101.7%

Amounts in millions

The Tier 1 Rate Guarantee Reserve that is used to pay for the interest crediting rate guarantee on active Tier 1 member accounts when actual investment earnings are below the assumed rate has decreased slightly from a reserve of \$183 million as of December 31, 2015 to a reserve of \$181 million as of December 31, 2016 due to investment performance and Tier 1 retirement patterns in 2016. Tier 1 non-retired member accounts that are linked to the Rate Guarantee Reserve decreased from \$5.1 billion on December 31, 2015 to \$4.8 billion on December 31, 2016 due to retirements during the year of Tier 1 active members.

Market values are reported to Milliman by PERS. It is our understanding that the December 31 market values of select real estate and private equity investments are reported on a three-month lag basis. This valuation report does not attempt to quantify the impact of any such lag effects.

Liability Changes

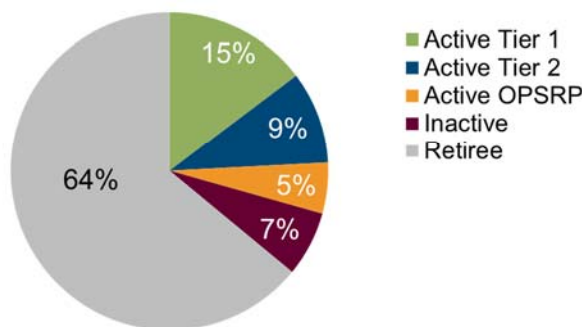
Since December 31, 2015, the system-wide actuarial accrued liability has increased primarily due to the interest on the liability as current active members get closer to retirement and the change in the investment return assumption. The normal cost, or the present value of projected future benefits for active members allocated to that year of service, was about one-quarter of the value of benefits paid out during the year. The remaining increase in the actuarial accrued liability was attributable to demographic experience, which includes both actual experience differing from assumption and the effect of new members joining the system during the year.

The Oregon Public Employees Retirement System is a mature system. There are currently 1.24 active members in the system for every annuitant (including retired members and beneficiaries). By comparison, the average ratio in NASRA’s November 2017 Public Fund Survey is 1.42. Since contributions to the system are based on active payroll, a lower active-to-annuitant ratio means there are fewer active member payroll dollars to support any actuarial gains or losses, such as for investment experience varying from assumption, in comparison to other peer systems. The ratio of active members to annuitants may decline further as a significant portion of the active members are currently eligible to retire.

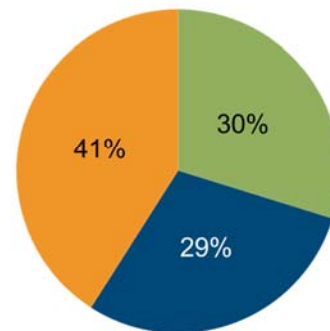
The left-hand chart below illustrates the distribution of the system’s actuarial accrued liability by member pension tier and status. While the majority of active liability is attributable to Tier 1 members, 71% of the system’s total actuarial accrued liability is due to members who are no longer actively working in covered employment. Only 14% of the liability is attributable to active Tier 2 and OPSRP members. Of the actuarial accrued liability that is attributable to actives, a large portion is located at or near prime retirement ages.

The right-hand chart below illustrates the distribution of the system’s normal cost. Tier 2 members account for 29% of the system’s normal cost compared to about 9% of the system’s actuarial accrued liability. OPSRP members account for over 40% of the normal cost compared to just 5% of the actuarial accrued liability.

Actuarial Accrued Liability by Member Category



Normal Cost by Member Category



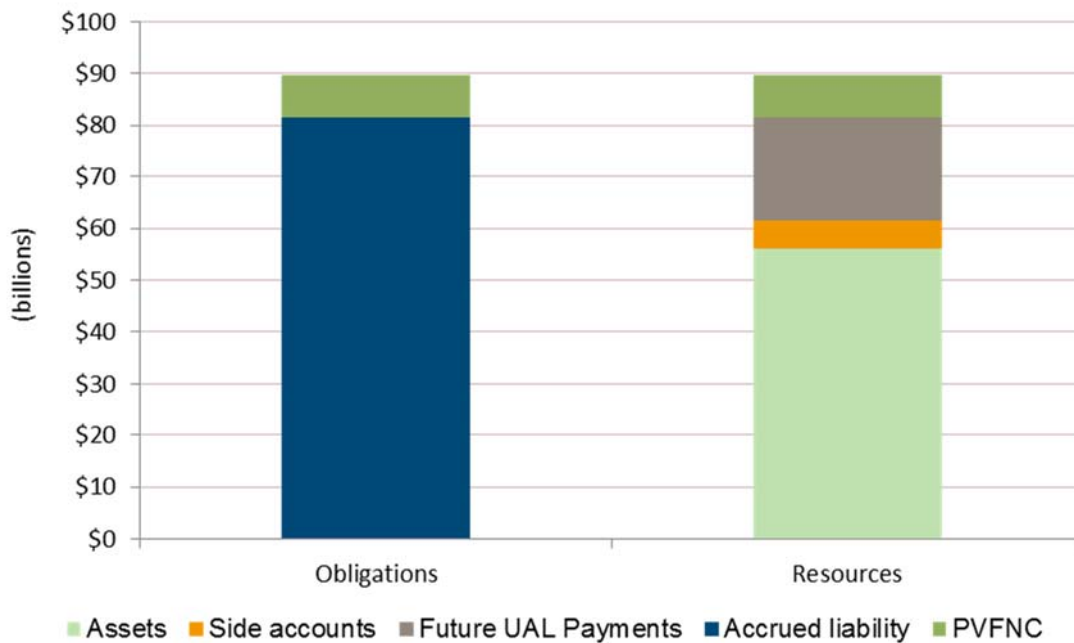
Actuarial Obligations and Resources

The actuarial accrued liability discussed above is the present value of benefits assigned to past service. The total actuarial present value of benefits is a broader measure that reflects both the actuarial accrued liability and the **present value of future normal cost (PVFNC)** for current members. Conceptually, this can be thought of as the total expected benefit obligation, in today’s dollars, associated with members as of the valuation date for service throughout their working careers. As of December 31, 2016, the **total actuarial present value of benefits** (also referred to as “total liability”) for the system was \$89.8 billion.

The resources to fund this expected obligation include assets the system has set aside as of the valuation date, plus the present value of expected future normal cost and UAL payments. By definition, the resources and obligations are equal in this “actuarial balance sheet”, as shown in the graph below.

Actuarial Obligations and Resources

December 31, 2016



Contributions to future normal costs and UAL payments are made as a percent of subject member salary, known as valuation payroll. The table below shows the amount of projected salary in the year following the valuation date as well as the present value of all future projected salary amounts for members included in the valuation.

(\$ in millions)	Projected Valuation Payroll for Year Subsequent to Valuation Date	Present Value of Future Valuation Payroll ¹
Tier 1/Tier 2	\$4,516.7	\$28,197.4
OPSRP General Service	4,746.4	45,229.8
OPSRP Police & Fire	609.4	7,508.7
Total	\$9,872.6	\$80,935.9

1. For members as of the valuation date.

Principal Valuation Results

A summary of principal valuation results from the current valuation and the prior valuation follows. Any changes in actuarial assumptions, methods or plan provisions between the two valuations are described after the summary. **Combined valuation payroll** is the projected Tier 1/Tier 2 payroll plus OPSRP payroll for the calendar year subsequent to the actuarial valuation date.

	Actuarial Valuation as of		Percent Change
	December 31, 2016	December 31, 2015	
Tier 1/Tier 2 Pension			
Actuarial accrued liability	\$76,253.3	\$72,454.1	5%
Actuarial value of assets	\$52,648.8	\$51,976.7	1%
Unfunded actuarial accrued liability	\$23,604.4	\$20,477.4	15%
Funded status	69%	72%	
UAL as a percentage of payroll	239%	215%	
Normal cost	\$697.4	\$713.1	(2%)
Tier 1/Tier 2 valuation payroll	\$4,516.7	\$4,730.8	(5%)
Normal cost rate	15.44%	15.07%	
OPSRP Pension			
Actuarial accrued liability	\$4,717.0	\$3,742.5	26%
Actuarial value of assets	\$3,021.4	\$2,389.1	26%
Unfunded actuarial accrued liability	\$1,695.6	\$1,353.5	25%
Funded status	64%	64%	
UAL as a percentage of payroll	17%	14%	
Normal cost	\$483.5	\$412.1	17%
OPSRP valuation payroll	\$5,355.8	\$4,813.3	11%
Normal cost rate	9.03%	8.56%	
Combined Pension			
Actuarial accrued liability	\$80,970.3	\$76,196.6	6%
Actuarial value of assets	\$55,670.2	\$54,365.8	2%
Unfunded actuarial accrued liability	\$25,300.1	\$21,830.8	16%
Funded status	69%	71%	
Combined valuation payroll	\$9,872.6	\$9,544.1	3%
UAL as a percentage of payroll	256%	229%	
Normal cost	\$1,180.9	\$1,125.2	5%
Combined valuation payroll	\$9,872.6	\$9,544.1	3%
Normal cost rate	11.96%	11.79%	

Amounts in millions

	Actuarial Valuation as of		Percent Change
	December 31, 2016	December 31, 2015	
RHIA			
Actuarial accrued liability	\$463.7	\$465.6	(0%)
Actuarial asset value	\$465.0	\$419.3	11%
Unfunded actuarial accrued liability	(\$1.3)	\$46.3	(103%)
Funded status	100%	90%	
Combined valuation payroll	\$9,872.6	\$9,544.1	3%
UAL as a percentage of payroll	0%	0%	
Normal cost	\$3.0	\$3.3	(10%)
Tier 1/Tier 2 valuation payroll	\$4,516.7	\$4,730.8	(5%)
Normal cost rate	0.07%	0.07%	
RHIPA			
Actuarial accrued liability	\$67.9	\$67.8	0%
Actuarial asset value	\$19.1	\$11.2	71%
Unfunded actuarial accrued liability	\$48.8	\$56.6	(14%)
Funded status	28%	16%	
Combined valuation payroll	\$2,881.4	\$2,831.8	2%
UAL as a percentage of payroll	2%	2%	
Normal cost	\$1.5	\$1.5	(2%)
Tier 1/Tier 2 valuation payroll	\$1,276.0	\$1,339.4	(5%)
Normal cost rate	0.12%	0.11%	

Amounts in millions

Data Summary

A brief summary of the data underlying the current and prior valuations follows. As shown below, the active member count increased about 2.6%, while the system's total member population increased by about 2.7%. The data section of this report provides additional detail. State Judiciary is included in the Tier 1 counts.

	December 31, 2016				December 31, 2015
	Tier 1	Tier 2	OPSRP	Total	Total
Active Members					
Count	26,964	38,257	107,262	172,483	168,177
Average age	55.9	50.7	42.5	46.4	46.6
Average total service	24.8	16.0	5.9	11.1	11.2
Average prior year covered salary	\$75,704	\$67,199	\$47,278	\$56,140	\$55,637
Inactive Members¹					
Count	14,965	15,534	14,822	45,321	42,849
Average age	59.1	53.2	48.0	53.4	52.8
Average monthly deferred benefit	\$2,083	\$711	\$373	\$1,053	\$1,064
Retired Members and Beneficiaries¹					
Count	124,171	11,648	2,964	138,783	136,298
Average age	72.1	67.0	66.6	71.6	71.3
Average monthly benefit ²	\$2,719	\$937	\$427	\$2,521	\$2,468
Total members	166,100	65,439	125,048	356,587	347,324

¹ Inactive and Retiree counts are shown by lives within the system. In other words, a member is counted once for purposes of this exhibit, regardless of their service history for different rate pools. This contrasts with the method used to count inactive participants in some of the later exhibits of this report.

² The average monthly benefit reflects an estimated adjustment for the effect of the Supreme Court decision in *Moro v. State of Oregon* for records that were not already adjusted in the data provided.

Effects of Changes

Effective with the December 31, 2016 actuarial valuation the following changes were made:

Assumption Changes

- Assumed average annual future long-term investment return was lowered from 7.5% to 7.2%.
- Interest crediting on regular and variable member accounts was also lowered to 7.20%.
- Assumed administrative expenses were updated for both Tier 1/Tier 2 and OPSRP.
- Mortality assumptions were changed to reflect updated base tables and mortality improvement projection scales for all groups.
- Termination, disability and retirement rates were updated for some groups to more closely match observed experience.
- Assumptions for merit increases, unused sick leave, and vacation pay were updated.
- The assumed healthcare cost trend rates for the RHIPA program as well as the participation assumptions for both RHIA and RHIPA were updated.

Method Changes

- The percentages used for allocating accrued liability for Tier 1/Tier 2 active members who have earned service with multiple PERS employers were updated.

Plan Changes

There were no changes to plan provisions since the December 31, 2015 actuarial valuation.

System-Wide Assets

System-Wide Assets

The table below reconciles the market value of assets, as provided by PERS, to the asset values used in this valuation.

	Tier 1/Tier 2	OPSRP	Side Accounts	Contingency and Capital Preservation Reserve	Rate Guarantee Reserve	RHIA and RHIPA	System Totals
Amount reported by PERS December 31, 2016	\$53,573.4	\$3,021.4	\$5,388.8	\$583.7	\$180.8	\$484.1	\$63,232.2
Adjustment for Recognized Transition Liability Receivable	(\$537.8)	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	(\$537.8)
Adjustment for Negative Rate Guarantee Reserve	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Net Pre-SLGRP Liabilities	(\$386.8)	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	(\$386.8)
December 31, 2016 Actuarial Value of Assets	\$52,648.8	\$3,021.4	\$5,388.8	\$583.7	\$180.8	\$484.1	\$62,307.6

Amounts in millions

PERS calculates the amount that should be transferred from side accounts to employer reserves in Tier 1/ Tier 2 and OPSRP for rate relief on a monthly basis. PERS does not track net Pre-SLGRP liabilities.

Employer supplemental deposits establish individual side accounts within the pension trust. The side accounts are treated as prepaid contributions. Employer contribution rates are first determined excluding side accounts. Then, an amortized portion of the side account is used to offset the contribution otherwise required for the individual employers that have side accounts. While side accounts are excluded from valuation assets in determining contribution rates for each of the rate pools, side accounts are included in valuation assets for financial reporting purposes such as the reporting of funded status.

In addition, pension assets are held in the Contingency Reserve, the Capital Preservation Reserve, and the Tier 1 Rate Guarantee Reserve (RGR). As shown below, at December 31, 2016 the RGR was in surplus status of \$181 million. It is possible for the RGR to be in deficit, which occurred most recently at December 31, 2012. It is our understanding that if a RGR deficit arose and then persisted for five years, employers may be required to restore the Tier 1 Rate Guarantee Reserve.

Tier 1/Tier 2 assets are adjusted by the net outstanding balance of pre-SLGRP liabilities to arrive at the actuarial value of assets. These notional employer-specific balances, created at the formation of the SLGRP and at later dates when additional employers join the pool, are treated akin to receivables to the SLGRP from individual employers (for pre-SLGRP liabilities) or payables – in the form of future rate offsets – from the SLGRP assets to individual employers (for pre-SLGRP surpluses). For accounting purposes, PERS recognizes outstanding pre-SLGRP liabilities as receivables in the system financial statements. However, for funding purposes, future contributions associated with pre-SLGRP liabilities are not current assets of the system. The resulting adjustment for Transition Liability receivables is shown above.

Finally, assets are held in separate accounts established under Internal Revenue Code Section 401(h) (the Retirement Health Insurance Account (RHIA) and the Retiree Health Insurance Premium Account (RHIPA)) to provide retiree medical benefits.

The following table reconciles the changes in the system-wide assets from December 31, 2015 to December 31, 2016. The reconciliation of assets is provided by PERS.

Reconciliation of Pension and Retiree Healthcare Assets	Tier 1/Tier 2	OPSRP	Side Accounts	Contingency Reserve	Capital Preservation Reserve	Rate Guarantee Reserve	RHIA and RHIPA	System Totals
Additions								
1. Contributions								
a. Employer	\$525.4	\$450.9	-	-	-	-	\$60.0	\$1,036.3
b. Transfer from side accounts ¹	\$628.5	-	(\$628.5)	-	-	-	-	-
c. Judge member contributions	\$1.7	-	-	-	-	-	-	\$1.7
d. Member service purchases	\$11.4	-	-	-	-	-	-	\$11.4
e. Recognized transition liability receivable	-	-	-	-	-	-	-	-
f. Total	\$1,167.0	\$450.9	(\$628.5)	-	-	-	\$60.0	\$1,049.3
2. Net investment income								
a. Transfers	\$5.0	-	-	(\$5.0)	-	-	-	-
b. From investments	\$3,697.5	\$204.7	\$383.2	(\$0.0)	-	(\$2.4)	\$31.9	\$4,314.9
c. Total	\$3,702.4	\$204.7	\$383.2	(\$5.0)	-	(\$2.4)	\$31.9	\$4,314.9
3. Other ²	\$7.4	\$0.0	-	-	-	-	-	\$7.4
4. Total additions	\$4,876.8	\$655.6	(\$245.3)	(\$5.0)	-	(\$2.4)	\$91.9	\$5,371.7
Deductions								
5. Retirement and survivor benefits	(\$4,226.7)	(\$17.4)	-	-	-	-	(\$36.7)	(\$4,280.8)
6. Death Benefits	(\$4.9)	-	-	-	-	-	-	(\$4.9)
7. Refund of contributions	(\$14.9)	-	-	-	-	-	-	(\$14.9)
9. Administrative expenses	(\$35.8)	(\$5.9)	(\$0.2)	-	-	-	(\$1.5)	(\$43.4)
10. Total deductions	(\$4,282.4)	(\$23.3)	(\$0.2)	-	-	-	(\$38.2)	(\$4,344.1)
11. Net change	\$594.4	\$632.3	(\$245.5)	(\$5.0)	-	(\$2.4)	\$53.7	\$1,027.6
12. Net assets held in trust for pension benefits								
a. Beginning of year	\$52,979.0	\$2,389.1	\$5,634.3	\$588.6	-	\$183.2	\$430.5	\$62,204.6
b. End of year	\$53,573.4	\$3,021.4	\$5,388.8	\$583.7	-	\$180.8	\$484.1	\$63,232.2

Amounts in millions

¹ Side account transfers shown in this exhibit are all credited to Tier 1/Tier 2 assets. We understand the portion to be credited to OPSRP is credited through the employer contribution line of the exhibit.

² Includes TRFA transfer from Metlife and adjustments by PERS.

Reconciliation of Side Accounts

Side accounts are established for employers who make supplemental payments (a lump sum payment in excess of the required employer contribution). For SLGRP employers, this supplemental payment is first applied toward the employer's Transition Liability, and any excess is established in a Side Account. A reconciliation of the side accounts from December 31, 2015 to December 31, 2016, is shown below on a rate pool basis. For this exhibit, all independent employers are grouped together.

	SLGRP	School Districts	Independent Employers	System Totals
Side Accounts, December 31, 2015	\$2,502.6	\$3,041.6	\$90.1	\$5,634.3
Deposits during 2016	0.0	0.0	0.0	0.0
Interest	170.1	207.0	6.2	383.2
Administrative expenses	(0.0)	(0.1)	(0.0)	(0.2)
Transfers to employer reserves	(287.7)	(331.1)	(9.7)	(628.5)
Side Accounts, December 31, 2016	\$2,385.0	\$2,917.2	\$86.6	\$5,388.8

Amounts in millions

Development of Side Account Rate Relief

The rate relief attributable to an employer's side account is determined by amortizing the side account balance on the valuation date over a fixed period and expressing the result as a percentage of combined valuation payroll. For side accounts established on or before December 31, 2009, the fixed period ends December 31, 2027. For side accounts established later, the fixed period ends 18 years after the first rate-setting valuation following its creation. The table below shows the average rate relief attributable to side accounts for each rate pool. While results are shown at a rate pool level, the rate relief provided by side accounts varies from employer to employer.

	December 31, 2016			
	SLGRP	School Districts	Independent Employers	System Totals
1. Side Account	\$2,385.0	\$2,917.2	\$86.6	\$5,388.8
2. Combined valuation payroll	\$5,714.0	\$3,240.7	\$917.8	\$9,872.6
3. Average Amortization Factor ¹	9.013	9.188	9.124	9.110
4. Average Side Account Rate Relief (1. ÷ 2. ÷ 3.)	4.63%	9.80%	1.03%	5.99%

Amounts in millions

¹ Weighted average

Pension Plan Valuation

Tier 1/Tier 2 Pension Assets

Summary of Actuarial Value of Assets

This section summarizes the Tier 1/Tier 2 pension valuation assets as of the current and prior actuarial valuation. For valuation purposes, Tier 1/Tier 2 pension assets are divided among the State & Local Government Rate Pool (SLGRP), the School District Pool, and various independent employers to determine employer contribution rates. For this system-wide report, all independent employers, including State Judiciary, have been grouped together as if they were a rate pool.

	SLGRP	School Districts	Independent Employers	Tier 1/Tier 2 Totals ¹
December 31, 2016				
Member reserves	\$3,665.3	\$1,977.8	\$525.1	\$6,168.1
Employer reserves	13,754.5	8,969.8	2,402.3	24,994.9
Benefit in force reserves	10,999.7	9,005.4	1,842.7	21,872.7
Net outstanding pre-SLGRP liabilities	(386.8)			(386.8)
Total actuarial value of assets	\$28,032.6	\$19,952.9	\$4,770.0	\$52,648.8
December 31, 2015				
Member reserves	\$3,826.2	\$2,093.1	\$557.5	\$6,476.8
Employer reserves	12,993.9	8,271.8	2,283.1	23,410.5
Benefit in force reserves	11,300.8	9,322.4	1,876.9	22,527.7
Net outstanding pre-SLGRP liabilities	(438.3)			(438.3)
Total actuarial value of assets	\$27,682.7	\$19,687.3	\$4,717.5	\$51,976.7

Amounts in millions

¹ Includes Multnomah Fire District #10.

Please note that pre-SLGRP liabilities and surpluses are notional balances specific to individual employers or groups of employers. For contribution rate calculations, pre-SLGRP liabilities are treated akin to receivables to the SLGRP from the individual employers and pre-SLGRP surpluses are treated akin to payables (in the form of future rate offsets) from the SLGRP assets to individual employers. The assets of the SLGRP used to calculate the pooled contribution rate reflect the net outstanding balance of these items.

Side accounts are treated as pre-paid contributions. Consequently, they are not reflected in the actuarial value of assets shown above. The actuarial value of assets for each rate pool is used to develop the contribution rate for that pool. Side accounts are used by employers to pay a portion of the base contribution rate via a side account rate offset and deduction mechanism. The net impact of side accounts is shown in a separate section of this report.

Reconciliation of Actuarial Value of Assets

The table below shows a reconciliation of the actuarial value of assets from the prior valuation to the current valuation for each of the rate pools. Again, independent employers, including State Judiciary, are treated as if they were a single rate pool for purposes of the system-wide report.

	SLGRP	School Districts	Independent Employers	Tier 1/Tier 2 Totals ¹
Actuarial value of assets, December 31, 2015	\$27,682.7	\$19,687.3	\$4,717.5	\$51,976.7
Contributions				
Employer	\$354.7	\$154.4	\$78.8	\$587.9
Side account transfers	287.7	331.1	9.7	628.5
Member	0.0	0.0	1.7	1.7
Total contributions	642.4	485.5	90.2	1,218.1
Investment income	1,935.2	1,371.8	329.1	3,626.9
Benefit payments and expenses	(2,153.7)	(1,763.2)	(360.8)	(4,282.6)
Adjustments ²	(74.0)	171.5	(6.1)	109.7
Actuarial value of assets, December 31, 2016	\$28,032.6	\$19,952.9	\$4,770.0	\$52,648.8

Amounts in millions

¹ Includes Multnomah Fire District #10.

² Adjustments include a reallocation of the benefits in force reserve, transfers to Multnomah Fire District #10, member service purchases, and other adjustments made by PERS.

Outstanding Balance of Pre-SLGRP Liabilities

In the valuation, pre-SLGRP liabilities are treated as assets of the SLGRP. That is, a pre-SLGRP liability is treated as a receivable owed to the SLGRP by the employer. Pre-SLGRP surpluses are treated as payables from the SLGRP to employers.

Prior to the formation of the SLGRP, the State and Community Colleges were pooled together and some employers participated in the Local Government Rate Pool (LGRP). The UAL attributable to the State and Community Colleges or the LGRP at the time the SLGRP was formed is maintained separately from the SLGRP, and is reduced by contributions and increased for interest charges at the assumed interest rate.

Similarly, when an independent employer joins the SLGRP, a transition liability or surplus is calculated to ensure that each employer enters the pool on a comparable basis. The transition liability is maintained separately from the SLGRP, and is reduced by contributions and increased for interest charges at the assumed interest rate. The table below shows the reconciliation of the pre-SLGRP pooled liability attributable to the State and Community Colleges and the LGRP from the last valuation to the current valuation. It also shows the reconciliation of the total transition liability or surplus from the last valuation to the current valuation.

	State and Community Colleges	Local Government Rate Pool	Transition	Total
1. Pre-SLGRP liability/(surplus), January 1, 2016	\$539.5	(\$229.0)	(\$748.8)	(\$438.3)
2. Employer contributions	(61.4)	25.7	77.0	\$41.3
3. Supplemental payments	0.0	0.0	(4.8)	(\$4.8)
4. Interest	35.9	(15.2)	(47.3)	(\$26.7)
5. Employer mergers/adjustments	0.0	0.0	41.6	\$41.6
6. Pre-SLGRP liability/(surplus), December 31, 2016				
(1. + 2. + 3. + 4. + 5.)	\$514.0	(\$218.6)	(\$682.3)	(\$386.8)

Amounts in millions

Tier 1/Tier 2 Pension Liabilities

Normal Cost

The normal cost represents the present value of benefits allocated to the next year of service by the actuarial cost method. If all current actuarial assumptions are met in both past and future years, the normal cost represents the percent of payroll that would need to be contributed each year to fully fund plan benefits during each member’s working career.

A summary of the normal cost by actuarial decrement is shown below on a system-wide basis for the Tier 1/Tier 2 pension benefits.

	December 31, 2016	December 31, 2015	Percent Change
Normal Cost			
Service Retirement	\$464.5	\$462.2	0.5%
Withdrawal	\$173.3	\$193.0	(10.2%)
Duty Disability	\$3.1	\$3.2	(1.7%)
Nonduty Disability	\$14.2	\$16.5	(14.1%)
Death	\$4.9	\$5.3	(7.7%)
Administrative Expenses	\$37.5	\$33.0	13.6%
Total Normal Cost	\$697.4	\$713.1	(2.2%)

Amounts in millions

Reconciliation of Change in Normal Cost

The decrease in normal cost since the prior valuation is primarily due to the reduction in active Tier 1/Tier 2 members as members retire from the closed Tier 1/Tier 2 group. The decrease was partially offset by the impact of changes to actuarial assumptions effective with the current valuation.

The table below reconciles the normal cost from the prior valuation to the current valuation.

	Tier 1/Tier 2 Pension
Normal Cost, December 31, 2015	\$713.1
Expected increase (decrease)	(40.9)
Assumption and method changes	22.0
Plan changes	-
Deviations from expected experience	
Pay increases	(0.7)
Interest crediting experience	0.1
All other sources	3.7
Total demographic (gains) and losses	3.1
Normal Cost, December 31, 2016	\$697.4

Amounts in millions

A summary of the normal cost by tier and employment category for each rate pool is shown below. Again, independent employers, including State Judiciary, are treated as if they were a single rate pool for purposes of the system-wide report.

Summary of Pension Normal Cost by Group and Tier						
	December 31, 2016			December 31, 2015		
	SLGRP	School Districts	Independent Employers	Tier 1/ Tier 2 Totals	Tier 1/ Tier 2 Totals	Percent Change
Normal Cost¹						
Tier 1 General Service	\$167.1	\$103.7	\$24.4	\$295.2	\$320.0	(7.7%)
Tier 2 General Service	\$137.9	\$111.0	\$19.3	\$268.3	\$258.5	3.8%
Tier 1 Police & Fire	\$41.9	\$0.2	\$14.3	\$56.4	\$60.3	(6.5%)
Tier 2 Police & Fire	\$59.5	\$0.3	\$17.7	\$77.5	\$74.3	4.4%
Total Normal Cost	\$406.5	\$215.1	\$75.8	\$697.4	\$713.1	(2.2%)

Amounts in millions

¹ Includes assumed administrative expenses. Assumed expenses allocated pro-rata based on normal cost.

Actuarial Accrued Liability

The actuarial accrued liability represents the present value of benefits allocated to prior years of service by the actuarial cost method. A summary of the actuarial accrued liability is shown below on a system-wide basis for the Tier 1/Tier 2 pension benefits.

	December 31, 2016	December 31, 2015	Percent Change
Active Members	\$19,564.2	\$19,193.8	1.9%
Inactive Members	5,033.5	4,618.8	9.0%
Retired Members and Beneficiaries	51,655.5	48,641.5	6.2%
Total Actuarial Accrued Liability	\$76,253.3	\$72,454.1	5.2%

Amounts in millions

Actuarial Accrued Liability

A summary of actuarial accrued liabilities based on member status, tier and employment category is shown in the table below. For this exhibit, all independent employers, including State Judiciary, have been grouped together.

	December 31, 2016			December 31, 2015		Percent Change
	SLGRP	School Districts	Independent Employers	Tier 1 / Tier 2 Totals ¹	Tier 1 / Tier 2 Totals ¹	
Active Members						
Tier 1 General Service	\$5,616.0	\$3,854.8	\$702.3	\$10,173.1	\$10,495.7	(3.1%)
Tier 1 Police & Fire	1,261.7	4.4	463.3	1,729.4	1,779.9	(2.8%)
Tier 1 Total	6,877.7	3,859.2	1,165.6	11,902.5	12,275.5	(3.0%)
Tier 2 General Service	3,158.1	2,518.2	447.8	6,124.1	5,542.4	10.5%
Tier 2 Police & Fire	1,182.8	4.8	350.0	1,537.6	1,375.9	11.8%
Tier 2 Total	4,340.9	2,523.0	797.8	7,661.7	6,918.3	10.7%
Total Active Members	11,218.6	6,382.2	1,963.5	19,564.2	19,193.8	1.9%
Inactive Members	3,155.4	1,502.5	375.6	5,033.5	4,618.8	9.0%
Retired Members and Beneficiaries	25,977.4	21,267.5	4,351.7	51,655.5	48,641.5	6.2%
Total Tier 1/ Tier 2 Pension Liability, December 31,	40,351.3	29,152.2	6,690.8	76,253.3	72,454.1	5.2%

Amounts in millions

¹ Includes Multnomah Fire District #10.

Reconciliation of Change in Actuarial Accrued Liability

The change in actuarial accrued liability since the last valuation reflects the experience of the system. The actuarial accrued liability is expected to increase due to benefits earned during the year and interest, and to decrease due to benefits paid during the year. The changes to actuarial assumptions made with the current valuation, including lowering the assumed investment return assumption to 7.20%, increased actuarial liability by approximately \$2.1 billion.

The table below reconciles the actuarial accrued liability from the last valuation to this valuation.

	Tier 1/Tier 2 Pension
Actuarial Accrued Liability December 31, 2015	\$72,454.1
Expected change	1,734.1
Assumption and method changes	2,096.4
Plan changes	-
Deviations from expected experience	
Retirements from active status	(59.6)
Disability retirements	(7.3)
Active mortality and withdrawal	65.7
Pay increases	(36.6)
Interest crediting experience	5.4
Inactive mortality	8.3
COLA experience	-
Data corrections	25.6
Other	(33.4)
Total demographic (gains) and losses	(31.9)
New Entrants	0.5
Actuarial Accrued Liability December 31, 2016	\$76,253.3

Amounts in millions

Tier 1/Tier 2 Pension Unfunded Accrued Liability (UAL)**Calculation of UAL**

The Unfunded Accrued Liability (UAL) represents the difference between the actuarial accrued liability and the valuation assets. To determine uncollared and collared base employer contribution rates, the UAL is calculated excluding side accounts. The calculated collared base contribution rate is later offset by an amortized portion of the side accounts for individual employers with such accounts. A summary of the UAL by rate pool is shown on the following table. All independent employers, including State Judiciary, have been grouped together.

	SLGRP	School Districts	Independent Employers	Tier 1 / Tier 2 Totals ¹
December 31, 2016				
1. Actuarial accrued liability	\$40,351.3	\$29,152.2	\$6,690.8	\$76,253.3
2. Actuarial value of assets	\$28,032.6	\$19,952.9	\$4,770.0	\$52,648.8
3. Unfunded accrued liability	\$12,318.7	\$9,199.2	\$1,920.9	\$23,604.4
4. Funded percentage (2. ÷ 1.)	69.5%	68.4%	71.3%	69.0%
5. Combined Valuation Payroll	\$5,714.0	\$3,240.7	\$917.8	\$9,872.6
6. Unfunded accrued liability as % of combined valuation payroll (3. ÷ 5.)	215.6%	283.9%	209.3%	239.1%
December 31, 2015				
1. Actuarial accrued liability	\$38,396.8	\$27,670.7	\$6,327.1	\$72,454.1
2. Actuarial value of assets	\$27,682.7	\$19,687.3	\$4,717.5	\$51,976.7
3. Unfunded accrued liability	\$10,714.1	\$7,983.4	\$1,609.6	\$20,477.4
4. Funded percentage (2. ÷ 1.)	72.1%	71.1%	74.6%	71.7%
5. Combined Valuation Payroll	\$5,594.3	\$3,060.7	\$889.1	\$9,544.1
6. Unfunded accrued liability as % of combined valuation payroll (3. ÷ 5.)	191.5%	260.8%	181.0%	214.6%

Amounts in millions

¹ Includes Multnomah Fire District #10.

Reconciliation of UAL Bases

Beginning with the December 31, 2007 actuarial valuation, each odd-year valuation has established a 20-year closed-period amortization schedule for outstanding regular Tier 1/Tier 2 UAL amounts. As part of the 2012 review of actuarial methods and assumptions, the PERS Board decided to reset the Tier 1/Tier 2 amortization period to 20 years effective with the December 31, 2013 valuation. This means the entire unamortized Tier 1/Tier 2 UAL for each rate pool and independent employer was re-amortized over a 20 year period as a level percentage of projected future payroll. For the December 31, 2015 and subsequent odd-year valuations, amortization schedules are calculated based on the total Tier 1/Tier 2 UAL as of that valuation date less the remaining unamortized balance of previously established Tier 1/Tier 2 UAL bases.

This even-year advisory valuation shows both the progress of the amortization bases established in the prior rate-setting valuations and an estimate of the base to be established on December 31, 2017, with the estimate based on experience during 2016. The payment schedules for the unamortized UAL balances as of December 31, 2016, have been modified to reflect the lowering of the investment return assumption first effective with this valuation.

The UAL amortization schedules are shown for the SLGRP and School District rate pools below. UAL bases for independent employers are developed individually for each employer, and are shown in each employer's individual valuation report.

SLGRP					
Amortization Base	UAL December 31, 2015	Payment	Interest	UAL December 31, 2016	Next Year's Payment
December 31, 2013	\$3,880.5	\$301.7	\$279.0	\$3,857.8	\$305.7
December 31, 2015	\$6,833.6	\$494.5	\$492.8	\$6,831.9	\$499.9
December 31, 2016	N/A	N/A	N/A	\$1,629.0	\$115.0
Total				\$12,318.7	\$920.7

Amounts in millions

School Districts					
Amortization Base	UAL December 31, 2015	Payment	Interest	UAL December 31, 2016	Next Year's Payment
December 31, 2013	\$3,422.1	\$266.1	\$246.0	\$3,402.1	\$269.6
December 31, 2015	\$4,561.3	\$330.0	\$328.9	\$4,560.1	\$333.7
December 31, 2016	N/A	N/A	N/A	\$1,237.0	\$87.3
Total				\$9,199.2	\$690.6

Amounts in millions

Actuarial Gain or Loss since Prior Valuation

In every actuarial valuation, assumptions are made as to the future experience of the plan and covered group of participants. Whenever there is a difference between the actual experience and that anticipated by the actuarial assumptions, there is an actuarial gain or loss to the plan. Gains are the result of experience that is more financially favorable to the system than assumed (i.e., serves to reduce the unfunded accrued liability or increase the surplus), while losses are the result of financially unfavorable experience to the system.

The table below shows the development of the actuarial gain (or loss) for the Tier 1/Tier 2 pension benefits for the year ending December 31, 2016. For this exhibit, all independent employers, including State Judiciary, have been grouped together.

	December 31, 2016			
	SLGRP	School District	Independent Employers	Tier 1/Tier 2 Totals ¹
1. Expected actuarial accrued liability				
a. Actuarial accrued liability at January 1, 2016	\$38,396.8	\$27,670.7	\$6,327.1	\$72,454.1
b. Normal cost at January 1, 2016	405.2	200.0	74.9	680.2
c. Benefit payments for fiscal year ending December 31, 2016	(2,135.6)	(1,748.4)	(357.5)	(4,246.3)
d. Interest	2,814.9	2,017.2	463.9	5,300.3
e. Expected actuarial accrued liability before changes (a. + b. + c. + d.)	\$39,481.4	\$28,139.5	\$6,508.4	\$74,188.2
f. Change in actuarial accrued liability at December 31, 2016, due to assumption, method, and plan changes	978.8	943.7	172.2	2,096.4
g. Expected actuarial accrued liability at December 31, 2016 (e. + f.)	\$40,460.2	\$29,083.2	\$6,680.6	\$76,284.6
2. Actuarial accrued liability at December 31, 2016	\$40,351.3	\$29,152.2	\$6,690.8	\$76,253.3
3. Liability gain/(loss) (1.g. - 2)	\$108.9	(\$69.0)	(\$10.2)	\$31.3
4. Expected actuarial value of assets				
a. Actuarial value of assets at January 1, 2016	\$27,682.7	\$19,687.3	\$4,717.5	\$51,976.7
b. Actual contributions for 2016	642.4	485.5	90.2	1,218.1
c. Benefit payments and expenses for fiscal year ending December 31, 2016	(2,153.7)	(1,763.2)	(360.8)	(4,282.6)
d. Assumed investment return	2,019.5	1,428.6	343.7	3,783.3
e. Expected actuarial value of assets before changes (a. + b. + c. + d.)	\$28,190.9	\$19,838.2	\$4,790.6	\$52,695.6
f. Change in actuarial value of assets at December 31, 2016, due to assumption changes	0.0	0.0	0.0	0.0
g. Expected actuarial value of assets at December 31, 2016 (e. + f.)	\$28,190.9	\$19,838.2	\$4,790.6	\$52,695.6
5. Actuarial value of assets as of December 31, 2016	\$28,032.6	\$19,952.9	\$4,770.0	\$52,648.8
6. Asset gain/(loss) (5. - 4.g.)	(\$158.3)	\$114.7	(\$20.7)	(\$46.8)
7. Net actuarial gain/(loss) (3. + 6.)	(\$49.4)	\$45.8	(\$30.9)	(\$15.5)
<i>Amounts in millions</i>				

¹ Includes Multnomah Fire District #10.

Reconciliation of the UAL

The table below reconciles the UAL from the last valuation to this valuation. For this exhibit, all independent employers, including State Judiciary, have been grouped together.

	SLGRP	School Districts	Independent Employers	Tier 1 / Tier 2 Totals ¹
UAL, December 31, 2015	\$10,714.1	\$7,983.4	\$1,609.6	\$20,477.4
Normal cost	405.2	200.0	74.9	680.2
Administrative expenses	18.1	14.8	3.2	36.2
Contributions	(642.4)	(485.5)	(90.2)	(1,218.1)
Liability (gain) or loss	(108.9)	69.0	10.2	(31.3)
Asset (gain) or loss	158.3	(114.7)	20.7	46.8
Assumption, method, and plan changes	978.8	943.7	172.2	2,096.4
Interest at 7.50%	795.3	588.6	120.3	1,517.0
UAL, December 31, 2016	12,318.7	9,199.2	1,920.9	23,604.4

Amounts in millions

¹ Includes Multnomah Fire District #10.

Tier 1/Tier 2 Pension Contribution Rate Development**Normal Cost Rates**

The table below shows the development of the system-wide weighted average Tier 1/ Tier 2 normal cost rate.

	December 31, 2016	December 31, 2015	Percent Change
Normal Cost			
a. Service Retirement	\$464.5	\$462.2	0.5%
b. Withdrawal	173.3	193.0	(10.2%)
c. Duty Disability	3.1	3.2	(1.7%)
d. Nonduty Disability	14.2	16.5	(14.1%)
e. Death	4.9	5.3	(7.7%)
f. Administrative Expenses	37.5	33.0	13.6%
g. Total Normal Cost	697.4	713.1	(2.2%)
Tier 1/ Tier 2 Valuation Payroll	\$4,516.7	\$4,730.8	(4.5%)
Average Normal Cost Rate			
a. Service Retirement	10.28%	9.77%	
b. Withdrawal	3.84%	4.08%	
c. Duty Disability	0.07%	0.07%	
d. Nonduty Disability	0.31%	0.35%	
e. Death	0.11%	0.11%	
f. Administrative Expenses	0.83%	0.70%	
g. Average Normal Cost Rate	15.44%	15.07%	

Amounts in millions

The table below shows the development of the Tier 1/Tier 2 normal cost rate for the various rate pools. For this exhibit, all independent employers, including State Judiciary, have been grouped together.

	SLGRP	School Districts	Independent Employers	Tier 1 / Tier 2 Totals
Normal Cost				
Tier 1 General Service	\$167.1	\$103.7	\$24.4	\$295.2
Tier 2 General Service	137.9	111.0	19.3	268.3
Tier 1 Police & Fire	41.9	0.2	14.3	56.4
Tier 2 Police & Fire	59.5	0.3	17.7	77.5
Total Normal Cost	406.5	215.1	75.8	697.4
Tier 1/ Tier 2 Valuation Payroll				
Tier 1 General Service	956.1	647.0	129.7	1,732.8
Tier 2 General Service	1,099.8	883.5	153.0	2,136.3
Tier 1 Police & Fire	189.2	0.8	63.2	253.2
Tier 2 Police & Fire	301.7	1.4	91.4	394.4
Total Valuation Payroll	\$2,546.7	\$1,532.7	\$437.3	\$4,516.7
Average Normal Cost Rates				
Tier 1 General Service	17.48%	16.02%	18.82%	17.04%
Tier 2 General Service	12.54%	12.56%	12.63%	12.56%
Tier 1 Police & Fire	22.14%	23.31%	22.65%	22.27%
Tier 2 Police & Fire	19.73%	21.73%	19.40%	19.66%
Average Rates				
Tier 1 Average	18.25%	16.03%	20.08%	17.70%
Tier 2 Average	14.09%	12.58%	15.16%	13.66%
General Service Average	14.84%	14.02%	15.47%	14.56%
Police & Fire Average	20.66%	22.33%	20.73%	20.68%
System Average	15.96%	14.04%	17.33%	15.44%
Member Contributions			0.38%	0.04%
Employer System Average	15.96%	14.04%	16.95%	15.40%

Amounts in millions

UAL Rates Prior to Application of the Rate Collar

The Tier 1/Tier 2 UAL rate prior to application of the rate collar is determined by calculating the sum of next year's scheduled amortization payments to the Tier 1/Tier 2 UAL as a percentage of combined (Tier 1/Tier 2 plus OPSRP) valuation payroll.

The following table develops the Tier 1/Tier 2 UAL rate separately for each of the rate pools. For this exhibit, all independent employers, including State Judiciary, have been grouped together.

	SLGRP	School Districts	Independent Employers	Tier 1 / Tier 2 Totals ¹
December 31, 2016				
1. Total UAL	\$12,318.7	\$9,199.2	\$1,920.9	\$23,604.4
2. Next year's UAL payment	\$920.7	\$690.6	\$142.2	\$1,753.5
3. Combined valuation payroll	\$5,714.0	\$3,240.7	\$917.8	\$9,872.6
4. UAL rate (2 ÷ 3)	16.11%	21.31%	15.49%	17.76%
December 31, 2015				
1. Total UAL	\$10,714.1	\$7,983.4	\$1,609.6	\$20,477.4
2. Next year's UAL payment	\$796.2	\$596.1	\$118.7	\$1,511.0
3. Combined valuation payroll	\$5,594.3	\$3,060.7	\$889.1	\$9,544.1
4. UAL rate (2 ÷ 3)	14.23%	19.48%	13.35%	15.83%

Amounts in millions

¹ While the Tier 1/Tier 2 Total UAL amount includes the UAL for Multnomah Fire District #10 (MFD), the UAL rate for MFD is developed separately in this report and is added to the rates shown in this table.

Pre-SLGRP Pooled Rate

Prior to the formation of the SLGRP, the State and Community Colleges were pooled together and some employers participated in the Local Government Rate Pool (LGRP). The Tier 1/Tier 2 UAL attributable to the State and Community Colleges and the LGRP at the time the SLGRP was formed is maintained separately from the Tier 1/Tier 2 UAL for the SLGRP. The balance of the pre-SLGRP pooled liability attributable to the State and Community Colleges or the LGRP on the valuation date is amortized over the period ending December 31, 2027 and expressed as a percentage of the pool's combined (Tier 1/Tier 2 plus OPSRP) valuation payroll.

The following table develops the Pre-SLGRP pooled rate separately for the State and Community College Pool and the LGRP.

	December 31, 2016	December 31, 2015
State and Community College Pool		
1. Total pre-SLGRP pooled liability	\$514.0	\$539.5
2. Combined valuation payroll	\$3,282.6	\$3,224.1
3. Amortization Factor	8.994	9.504
4. Pre-SLGRP pooled rate (1. ÷ 2. ÷ 3.)	1.74%	1.76%
Local Government Rate Pool		
1. Total pre-SLGRP pooled liability	(\$218.6)	(\$229.0)
2. Combined valuation payroll	\$1,444.6	\$1,393.0
3. Amortization Factor	8.994	9.504
4. Pre-SLGRP pooled rate (1. ÷ 2. ÷ 3.)	(1.68%)	(1.73%)

Amounts in millions

Transition Liability or Surplus Rate

When an employer joins the SLGRP, a transition liability or surplus is calculated to ensure that each employer enters the pool on a comparable basis. The transition liability is maintained separately from the Tier 1/Tier 2 UAL for the SLGRP. The transition liability is amortized over a fixed period, and is expressed as a percentage of the employer’s combined (Tier 1/Tier 2 plus OPSRP) valuation payroll. For employers joining the SLGRP prior to December 31, 2009, the fixed period ends December 31, 2027. For all others, the fixed period ends 18 years after the date the employer joined the SLGRP.

The following table develops the average rate impact across all employers with outstanding transition liabilities or surpluses as of the valuation date. The amortization factor below reflects the weighted average of the amortization periods for all such employers.

	December 31, 2016	December 31, 2015
1. Total transition liability / (surplus)	(\$682.3)	(\$748.8)
2. Combined valuation payroll	\$2,264.0	\$2,225.2
3. Average Amortization Factor ¹	9.042	9.545
4. Average transition liability/(surplus) rate (1. ÷ 2. ÷ 3.)	(3.33%)	(3.53%)

Amounts in millions

¹ *Weighted average*

Multnomah Fire District #10 UAL Rate

The Multnomah Fire District #10 UAL rate is determined by amortizing Multnomah Fire District #10's unfunded accrued liability over the period ending December 31, 2027, and expressing the result as a percentage of combined valuation payroll.

As part of 2003 legislation, the Multnomah Fire District #10 UAL was allocated to all Tier 1/Tier 2 employers. Multnomah Fire District #10 was allocated \$50,000 of the outstanding UAL, which was fully paid in November, 2003. Of the remaining UAL, City of Portland is allocated 21.8743%, while all Tier 1/Tier 2 employers, including City of Portland, share in the remaining 78.1257%. In addition, four other employers (City of Gresham, City of Fairview, City of Wood Village, and City of Troutdale) are required to pay twice the rate that is determined under item 6.b. below. Thus, the combined valuation payroll for all Tier 1/Tier 2 employers, shown below in item 4.b., includes twice the valuation payroll for those four employers.

	December 31, 2016	December 31, 2015
1. Actuarial accrued liability		
a. Active members	\$0.0	\$0.0
b. Dormant members	0.0	0.0
c. Retired members and beneficiaries	58.9	59.5
d. Total actuarial accrued liability	\$58.9	\$59.5
2. Actuarial value of assets		
a. Employer reserve	(\$131.7)	(\$138.3)
b. Members reserve	0.0	0.0
c. Benefits in force reserve	25.0	27.6
d. Total actuarial value of asects	(\$106.7)	(\$110.8)
3. Multnomah FD #10 UAL	\$165.7	\$170.3
a. Portion allocated to City of Portland (21.8743% x 3.)	\$36.2	\$37.2
b. Portion allocated to all T1/T2 employers (78.1257% x 3.)	\$129.4	\$133.0
4. Combined valuation payroll		
a. City of Portland	\$362.9	\$350.2
b. All employers	\$9,925.0	\$9,593.1
5. Amortization factor	8.994	9.504
6. Multnomah FD #10 UAL Rate		
a. City of Portland (3.a. ÷ 4.a. ÷ 5.)	1.11%	1.12%
b. All Tier 1 / Tier 2 employers (3.b. ÷ 4.b. ÷ 5.)	0.14%	0.15%
7. Total Multnomah FD #10 UAL Rate		
a. City of Portland (6.a. + 6.b.)	1.25%	1.27%
b. City of Gresham, City of Fairview, City of Wood Village, City of Troutdale (2 x 6.b.)	0.28%	0.30%
c. All other Tier 1 / Tier 2 employers (6.b.)	0.14%	0.15%

Amounts in millions

Calculated Employer Contribution Rate Summary (Pre-Rate Collar)

The following table summarizes the development of the total Tier 1/Tier 2 contribution rate for each rate pool as of the valuation date. The normal cost rates apply to Tier 1/Tier 2 payroll only, but all other rates are applied to combined (Tier 1/Tier 2 plus OPSRP) valuation payroll. These rates are adjusted on an individual employer basis for side accounts and pre-SLGRP liabilities, if applicable. Weighted average adjustments for side accounts and pre-SLGRP liabilities are shown in the table. For individual employers, these adjustments cannot reduce the pension contribution rate below 0.0%. Note that independent employers, other than the State Judiciary, are subject to a minimum employer contribution rate of 6.0% that is not taken into account in the average rates below.

Advisory July 1, 2019 Rates Calculated as of December 31, 2016				
	SLGRP	School Districts	Independent Employers	Tier 1 / Tier 2 Totals
Tier 1/Tier 2 pension contribution rates				
Employer normal cost rate	15.96%	14.04%	16.95%	15.40%
Member normal cost rate			0.38%	0.04%
Uncollared UAL rate	16.11%	21.31%	15.49%	17.76%
Multnomah FD #10 rate	0.21%	0.14%	0.15%	0.18%
Total Tier 1/Tier 2 pension rate	32.28%	35.49%	32.97%	33.38%
Average adjustments				
Pre-SLGRP liability/(surplus) rate	(0.75%)	N/A	N/A	(0.43%)
Side account rate	(4.63%)	(9.80%)	(1.03%)	(5.99%)
Total average adjustment	(5.38%)	(9.80%)	(1.03%)	(6.42%)
Uncollared net pension contribution rate	26.90%	25.69%	31.94%	26.96%

Calculation of Rate Collar

Due to the rate collar, employer base contribution rates will not generally change by more than the greater of 3 percent of payroll or 20% of the current contribution rate. However, if the funded percentage is below 60% or above 140%, the size of the rate collar is doubled. If the funded percentage is between 60% and 70% or between 130% and 140%, the size of the rate collar is increased on a graded scale. All rate collar calculations are performed excluding amounts and contribution rates attributable to pre-SLGRP liabilities, side accounts and member IAP contributions. Retiree medical rates are also excluded from the rate collar calculation.

The table below develops the impact of the collar for each of the Tier 1/Tier 2 rate pools. Although the calculation is performed individually for independent employers, the table shows the calculation as if independent employers were a single rate pool. Note that independent employers, other than the State Judiciary, are subject to a minimum employer contribution rate of 6.0% that is not taken into account in the calculation below.

Advisory July 1, 2019 Rates Calculated as of December 31, 2016				
Calculation of Collar Adjustments	SLGRP	School Districts	Independent Employers	Tier 1 / Tier 2 Totals¹
1. Current employer contribution rate	21.88%	25.43%	20.27%	22.90%
2. Size of rate collar				
a. Preliminary size of rate collar <i>(maximum of 3% or 20% x 1.)</i>	4.38%	5.09%	4.05%	4.58%
b. Funded percentage	69%	68%	71%	69%
c. Size of rate collar (If b. < 60% or b. > 140%, 2 x a. If b. is 70%-130%, a. Otherwise, a graded rate between a. and 2 x a.)	4.82%	6.11%	4.05%	
3. July 1, 2019 Minimum employer contribution rate <i>(1. - 2.c.)</i>	17.06%	19.32%	16.22%	
4. July 1, 2019 Maximum employer contribution rate <i>(1. + 2.c.)</i>	26.70%	31.54%	24.32%	
5. Advisory July 1, 2019 employer contribution rate before collar	32.28%	35.49%	32.59%	
6. July 1, 2019 employer contribution rate after collar <i>(5., but not less than 3. or more than 4.)</i>	26.70%	31.54%	24.32%	
7. Impact of collar (6. - 5.)²	(5.58%)	(3.95%)	(8.27%)	(5.29%)

¹ The average Tier 1/Tier 2 rate has been recalculated based on current valuation payroll.

² The impact of collar shown for the system-wide column is the weighted average of the impact shown for each rate pool.

Calculated Employer Contribution Rate Summary (Post-Rate Collar)

Any needed adjustment to reflect the effects of the rate collar is made to the UAL rate. The table below summarizes the advisory average rates that would be effective July 1, 2019 by pool and component. Although the rate collar is applied individually for independent employers, the table shows the average rates as if independent employers were a single rate pool. Note that independent employers, other than the State Judiciary, are subject to a minimum employer contribution rate of 6.0% that is not taken into account in the average rates below.

Advisory July 1, 2019 Rates Calculated as of December 31, 2016				
	SLGRP	School Districts	Independent Employers	Tier 1 / Tier 2 Totals
Tier 1/Tier 2 pension contribution rates				
Employer normal cost rate	15.96%	14.04%	16.95%	15.40%
Member normal cost rate			0.38%	0.04%
Collared UAL rate	10.53%	17.36%	7.22%	12.47%
Multnomah FD #10 rate	0.21%	0.14%	0.15%	0.18%
Total Tier 1/Tier 2 pension rate	26.70%	31.54%	24.70%	28.09%
Average adjustments				
Pre-SLGRP liability/(surplus) rate	(0.75%)	N/A	N/A	(0.43%)
Side account rate	(4.63%)	(9.80%)	(1.03%)	(5.99%)
Total average adjustment	(5.38%)	(9.80%)	(1.03%)	(6.42%)
Collared net pension contribution rate	21.32%	21.74%	23.67%	21.67%

OPSRP Assets

Information on OPSRP assets is shown in the section of this report covering the system-wide assets. As of December 31, 2016, the actuarial value of assets for OPSRP is \$3,021.4 million.

OPSRP Liabilities

Normal Cost

The normal cost represents the present value of projected future benefits allocated to the next year of service by the actuarial cost method. If all current actuarial assumptions are met in past and future years, the normal cost represents the percent of payroll that would need to be contributed each year to fully fund each member's plan benefits during his or her working career.

A summary of the normal cost by assumed cause of future termination of service is shown below for the current and prior year.

	December 31, 2016			December 31, 2015		
	General Service	Police & Fire	Total	General Service	Police & Fire	Total
Pre-Retirement Disability						
Duty	\$0.6	\$0.9	\$1.5	\$0.5	\$0.8	\$1.3
Non-Duty	7.3	0.9	8.2	7.3	1.0	8.2
Total Pre-Retirement Disability	\$7.9	\$1.8	\$9.7	\$7.8	\$1.8	\$9.6
Other Benefits						
Service Retirement	\$341.8	\$72.3	\$414.1	\$288.8	\$62.5	\$351.3
Withdrawal	38.1	3.7	41.9	32.3	3.1	35.4
Death	3.9	0.6	4.6	3.6	0.6	4.2
Duty Disability Retirement	0.3	0.6	0.9	0.2	0.5	0.8
Non-Duty Disability Retirement	5.1	0.8	5.8	4.6	0.8	5.3
Total Other Benefits	\$389.3	\$78.0	\$467.3	\$329.6	\$67.5	\$397.0
Assumed Administrative Expenses	\$5.8	\$0.7	\$6.5	\$4.9	\$0.6	\$5.5
Total Normal Cost	\$402.9	\$80.6	\$483.5	\$342.2	\$69.9	\$412.1

Amounts in millions

The increase in the normal cost since the prior valuation is primarily attributable to the effect of new entrants to the OPSRP program. The impact of changes to actuarial assumptions effective with the current valuation also increased the normal cost compared to the prior valuation. The table below reconciles the normal cost from the prior valuation to the current valuation.

	OPSRP
Normal Cost, December 31, 2015	\$412.1
Expected increase	(11.1)
Assumption and method changes	26.6
Plan changes	0.0
New entrants	54.0
Deviations from expected experience	1.8
Normal Cost, December 31, 2016	\$483.5

Amounts in millions

Actuarial Accrued Liability

The actuarial accrued liability represents the present value of projected future benefits allocated to prior years of service by the actuarial cost method. For active members, a summary of the actuarial accrued liability by assumed cause of future termination of service is shown below for the current and prior year.

	December 31, 2016			December 31, 2015		
	General Service	Police & Fire	Total	General Service	Police & Fire	Total
Active Members						
Pre-retirement Duty Disability	\$1.0	\$1.9	\$2.9	\$0.8	\$1.6	\$2.4
Pre-retirement Non-Duty Disability	64.8	6.6	71.3	64.2	7.0	71.2
Service Retirement	3,220.2	610.2	3,830.4	2,583.0	485.5	3,068.5
Withdrawal	182.5	16.0	198.5	157.1	13.4	170.6
Death	34.1	5.0	39.1	30.0	4.3	34.3
Duty Disability Retirement	2.2	4.1	6.2	1.8	3.3	5.1
Non-Duty Disability Retirement	47.0	6.0	53.0	41.5	5.6	47.1
Total Active Members	\$3,551.7	\$649.7	\$4,201.4	\$2,878.5	\$520.7	\$3,399.2
Inactive Members			\$314.5			\$198.7
Retired Members and Beneficiaries			\$201.1			\$144.6
Total Actuarial Accrued Liability			\$4,717.0			\$3,742.5

Amounts in millions

The change in actuarial accrued liability since the last valuation reflects the experience of the system. The actuarial accrued liability is expected to increase due to benefits earned during the year and interest, and to decrease due to benefits paid during the year. The impact of changes to actuarial assumptions made with the current valuation also increased actuarial accrued liability compared to the prior valuation. The table below reconciles the actuarial accrued liability from the last valuation to this valuation.

	OPSRP
Actuarial Accrued Liability December 31, 2015	\$3,742.5
Expected change	684.5
Assumption and method changes	173.7
Plan changes	0.0
Deviations from expected experience	
Retirements from active status	3.9
Active mortality and withdrawal	22.7
Pay increases	(0.4)
Other	10.3
Total demographic (gains) and losses	36.5
New entrants	79.7
Actuarial Accrued Liability December 31, 2016	\$4,717.0

Amounts in millions

OPSRP Unfunded Accrued Liability (UAL)

Calculation of UAL

The Unfunded Accrued Liability (UAL) represents the difference between the actuarial accrued liability and the valuation assets. The UAL is amortized over combined (Tier 1/Tier 2 and OPSRP) valuation payroll. The table below shows the OPSRP UAL, funded status, and UAL as a percentage of combined valuation payroll.

	December 31, 2016	December 31, 2015
1. Actuarial accrued liability	\$4,717.0	\$3,742.5
2. Actuarial value of assets	\$3,021.4	\$2,389.1
3. Unfunded accrued liability	\$1,695.6	\$1,353.5
4. Funded percentage (2. ÷ 1.)	64.1%	63.8%
5. Combined valuation payroll	\$9,872.6	\$9,544.1
6. Unfunded accrued liability as % of combined valuation payroll	17.2%	14.2%

Amounts in millions

Reconciliation of UAL Bases

Beginning with the December 31, 2007, actuarial valuation, each odd-year valuation establishes a 16-year closed-period amortization base for outstanding OPSRP UAL amounts. For odd-year valuations subsequent to December 31, 2007, this amortization base is calculated based on the total OPSRP UAL as of that valuation date less the remaining unamortized balance of any OPSRP UAL bases established at previous odd-year valuation dates. In other words, OPSRP experience from December 31, 2013 to December 31, 2015 is amortized based on a 16-year amortization schedule beginning December 31, 2015.

This even-year advisory valuation shows both the progress of the amortization bases established in prior valuations and an estimate of the base to be established on December 31, 2017, with the estimate based on experience during 2016. The payment schedules for the unamortized UAL balances as of December 31, 2016, have been modified to reflect the lowering of the investment return assumption first effective with this valuation.

Reconciliation of UAL Bases					
Amortization Base	UAL, December 31, 2015	Payment	Interest	UAL, December 31, 2016	Next Year's Payment
December 31, 2007	(\$55.8)	(\$8.2)	(\$3.9)	(\$51.4)	(\$8.4)
December 31, 2009	\$138.9	\$16.9	\$9.7	\$131.7	\$17.3
December 31, 2011	\$52.6	\$5.5	\$3.7	\$50.8	\$5.6
December 31, 2013	\$457.8	\$42.7	\$32.6	\$447.7	\$43.5
December 31, 2015	\$760.0	\$64.3	\$54.4	\$750.2	\$65.3
December 31, 2016	N/A	N/A	N/A	\$366.8	\$30.4
Total				\$1,695.6	\$153.7

Amounts in millions

Actuarial Gain or Loss since Prior Valuation

In every actuarial valuation, assumptions are made as to the future experience of the plan and covered group of participants. Whenever there is a difference between the actual experience and that anticipated by the actuarial assumptions, there is an actuarial gain or loss to the plan. Gains are the result of experience that is more financially favorable to the system than anticipated (i.e., serves to reduce the unfunded accrued liability or increase the surplus), while losses are the result of experience that is financially unfavorable to the system. The 2015 liability loss is primarily due to new entrants to the OPSRP program.

The table below develops the actuarial gain or loss for OPSRP for the year ending December 31, 2016.

	OPSRP
1. Expected actuarial accrued liability	
a. Actuarial accrued liability at December 31, 2015	\$3,742.5
b. Normal cost at December 31, 2015 (excluding administrative expenses)	\$406.6
c. Benefit payments (excluding administrative expenses) for year ending December 31, 2016	(\$17.4)
d. Interest	\$295.3
e. Expected actuarial accrued liability before changes (a. + b. + c. + d.)	\$4,427.0
f. Change in actuarial accrued liability at December 31, 2016, due to assumption and method changes	\$173.7
g. Change in actuarial accrued liability at December 31, 2016, due to plan changes	\$0.0
h. Expected actuarial accrued liability at December 31, 2016 (e. + f. + g.)	\$4,600.8
2. Actuarial accrued liability at December 31, 2016	\$4,717.0
3. Liability gain/(loss) (1.h. - 2)	(\$116.2)
4. Expected actuarial value of assets	
a. Actuarial value of assets at December 31, 2015	\$2,389.1
b. Actual contributions for 2016	\$450.9
c. Benefit payments and administrative expenses for fiscal year ending December 31, 2016	(\$23.3)
d. Assumed investment return	\$195.2
e. Expected actuarial value of assets at December 31, 2016 (a. + b. + c. + d.)	\$3,011.9
5. Actuarial value of assets as of December 31, 2016	\$3,021.4
6. Asset gain/(loss) (5. - 4.e.)	\$9.5
7. Net actuarial gain/(loss) (3. + 6.)	(\$106.7)

Amounts in millions

Reconciliation of the UAL

The table below summarizes the changes in UAL since the prior valuation.

	OPSRP
UAL, December 31, 2015	\$1,353.5
Normal Cost (including actual administrative expenses)	412.5
Contributions	(450.9)
Liability (gain) or loss	116.2
Asset (gain) or loss	(9.5)
Assumption and method changes	173.7
Plan changes	0.0
Interest at 7.50%	100.1
UAL, December 31, 2016	\$1,695.6

Amounts in millions

OPSRP Contribution Rate Development

Normal Cost Rates

The table below shows the development of the OPSRP normal cost rates.

Development of Normal Cost Rate	December 31, 2016			December 31, 2015		
	General Service	Police & Fire	Total	General Service	Police & Fire	Total
Normal Cost						
Pre-retirement Disability Benefits	\$7.9	\$1.8	\$9.7	\$7.8	\$1.8	\$9.6
All Other Benefits	\$389.3	\$78.0	\$467.3	\$329.6	\$67.5	\$397.0
Assumed Administrative Expenses	\$5.8	\$0.7	\$6.5	\$4.9	\$0.6	\$5.5
Total Normal Cost	\$402.9	\$80.6	\$483.5	\$342.2	\$69.9	\$412.1
OPSRP Valuation Payroll	\$4,746.4	\$609.4	\$5,355.8	\$4,266.9	\$546.4	\$4,813.3
Normal Cost Rate						
Pre-retirement Disability Benefits	0.17%	0.29%	0.18%	0.18%	0.32%	0.20%
All Other Benefits	8.20%	12.80%	8.72%	7.72%	12.35%	8.25%
Assumed Administrative Expenses	0.12%	0.12%	0.12%	0.11%	0.11%	0.11%
Total Normal Cost	8.49%	13.22%	9.03%	8.02%	12.79%	8.56%

Amounts in millions

UAL Rates

The UAL rate is determined by calculating the sum of next year's scheduled amortization payments to the UAL as a percentage of combined (Tier 1/Tier 2 and OPSRP) valuation payroll.

	December 31, 2016	December 31, 2015
1. Total UAL	\$1,695.6	\$1,353.5
2. Next year's UAL payment	\$153.7	\$121.3
3. Combined valuation payroll	\$9,872.6	\$9,544.1
4. UAL rate (2 ÷ 3)	1.56%	1.27%

Amounts in millions

Calculated Employer Contribution Rates (Pre-Rate Collar)

The following table summarizes the OPSRP contribution rate for general service and police & fire members as of the valuation date, prior to application of the rate collar.

The normal cost rates apply to OPSRP payroll only, but the UAL rate is applied to combined (Tier 1/Tier 2 and OPSRP) valuation payroll. These rates, after the application of the rate collar, are combined with each employer's Tier 1/Tier 2 rates (other than Tier 1/Tier 2 normal cost rate) to determine each employer's pension contribution rate on OPSRP payroll.

Advisory July 1, 2019 Rates Calculated as of December 31, 2016			
	General Service	Police & Fire	Average Rate
OPSRP pension contribution rates			
Employer normal cost rate	8.49%	13.22%	9.03%
Employer UAL rate	1.56%	1.56%	1.56%
Total OPSRP pension rate	10.05%	14.78%	10.59%

Calculation of Rate Collar

The rate collar restricts the average OPSRP contribution rate so it generally cannot change by more than the greater of 3 percent of payroll or 20% of the current average OPSRP contribution rate. However, if the funded percentage is below 60% or above 140%, the size of the collar is doubled. If the funded percentage is between 60% and 70% or between 130% and 140%, the size of the rate collar is increased on a graded scale. All collar calculations are performed based on the weighted average OPSRP contribution rate, and any adjustment due to the collar is applied to the OPSRP UAL rate.

The table below shows the calculation of and any adjustment for the rate collar.

Advisory July 1, 2019 Rates Calculated as of December 31, 2016			
	General Service	Police & Fire	Average Rate
1. Current employer contribution rate	9.29%	14.06%	9.83%
2. Size of rate collar			
a. Preliminary size of rate collar (Maximum of 3% or 20% of 1.)			3.00%
b. Funded percentage			64%
c. Size of rate collar (If b. < 60% or b. > 140%, 2 x a.. If b. is 70%-130% a., otherwise a graded rate between a. and b.)			4.80%
3. July 1, 2019 Minimum contribution rate (1. - 2.c.)			5.03%
4. July 1, 2019 Maximum contribution rate (1. + 2.c.)			14.63%
5. Advisory July 1, 2019 employer contribution rate before collar	10.05%	14.78%	10.59%
6. Advisory July 1, 2019 employer contribution rate after collar	10.05%	14.78%	10.59%
7. Impact of collar (6. - 5.)	0.00%	0.00%	0.00%

Calculated Employer Contribution Rates (Post-Rate Collar)

The table below summarizes the OPSRP contribution rate for general service and police & fire members as of the valuation date, after adjustments for the rate collar.

Advisory July 1, 2019 Rates Calculated as of December 31, 2016			
	General Service	Police & Fire	Average Rate
OPSRP pension contribution rates			
Employer normal cost rate	8.49%	13.22%	9.03%
Employer UAL rate	1.56%	1.56%	1.56%
Total OPSRP pension rate	10.05%	14.78%	10.59%

Retiree Healthcare Valuation

Retiree Healthcare Assets

Assets

A reconciliation of retiree healthcare assets is shown below. The reconciliation of assets is provided by PERS.

	RHIA	RHIPA	Retiree Healthcare Totals
Additions			
1. Employer contributions	\$48.3	\$11.6	\$60.0
2. Net investment income	\$31.0	\$0.9	\$31.9
3. Other	<u>\$0.0</u>	<u>\$0.0</u>	<u>\$0.0</u>
4. Total additions	\$79.3	\$12.6	\$91.9
Deductions			
4. Healthcare Premium Subsidies	(\$32.4)	(\$4.3)	(\$36.7)
5. Administrative expenses	<u>(\$1.2)</u>	<u>(\$0.3)</u>	<u>(\$1.5)</u>
6. Total deductions	(\$33.6)	(\$4.6)	(\$38.2)
7. Net change	\$45.8	\$7.9	\$53.7
8. Net assets held in trust for benefits			
a. Beginning of year	\$419.3	\$11.2	\$430.5
b. End of year	\$465.0	\$19.1	\$484.1

Amounts in millions

Retiree Healthcare Liabilities

Normal Cost

A summary of the normal cost by decrement is shown below for the retiree healthcare benefits.

	RHIA			RHIPA		
	12/31/2016	12/31/2015	Percent Change	12/31/2016	12/31/2015	Percent Change
Normal Cost						
Service Retirement	\$2.2	\$2.4		\$1.4	\$1.4	
Withdrawal	0.7	0.8		0.0	0.0	
Duty Disability	0.0	0.0		0.0	0.0	
Nonduty Disability	0.1	0.1		0.1	0.1	
Death	<u>0.0</u>	<u>0.0</u>		<u>0.0</u>	<u>0.0</u>	
Total Normal Cost	\$3.0	\$3.3	(10.2%)	\$1.5	\$1.5	(2.1%)

Amounts in millions

The table below reconciles the normal cost from the prior valuation to the current valuation.

	RHIA	RHIPA
Normal Cost December 31, 2015	\$3.3	\$1.5
Expected increase/(decrease)	(0.1)	(0.1)
Assumption and method changes	(0.1)	0.0
Plan changes	-	-
Deviations from expected experience		
Demographic (gains) or losses	(0.1)	0.0
Normal Cost December 31, 2016	\$3.0	\$1.5

Amounts in millions

Actuarial Accrued Liability

A summary of the actuarial accrued liability by status is shown below for the retiree healthcare benefits.

	RHIA			RHIPA		
	12/31/2016	12/31/2015	Percent Change	12/31/2016	12/31/2015	Percent Change
Actives	\$78.1	\$84.9	(8.0%)	\$53.5	\$52.9	1.2%
Inactive Members	23.9	23.1	3.7%	0.0	0.0	0.0%
Retired Members and Beneficiaries	361.7	357.7	1.1%	14.4	14.9	(3.6%)
Total Actuarial Accrued Liability	\$463.7	\$465.6	(0.4%)	\$67.9	\$67.8	0.1%

Amounts in millions

The change in actuarial accrued liability since the last valuation reflects the experience of the system. The actuarial accrued liability is expected to increase due to benefits earned during the year and interest, and to decrease due to benefits paid during the year. The table below reconciles the actuarial accrued liability from the last valuation to this valuation.

	RHIA	RHIPA	Total
Actuarial Accrued Liability December 31, 2015	\$465.6	\$67.8	\$533.4
Expected change	\$4.8	\$2.2	\$6.9
Assumption and method changes	\$1.5	\$0.7	\$2.1
Plan changes	\$0.0	\$0.0	\$0.0
Deviations from expected experience			
Demographic (gains) or losses	(\$8.2)	(\$2.7)	(\$10.9)
Actuarial Accrued Liability December 31, 2016	\$463.7	\$67.9	\$531.6

Amounts in millions

Retiree Healthcare Unfunded Accrued Liability (UAL)

Calculation of UAL

The Unfunded Accrued Liability (UAL) represents the difference between the actuarial accrued liability and the valuation assets. A summary of the UAL by program is shown on the following table.

	RHIA			RHIPA		
	12/31/2016	12/31/2015	Percent Change	12/31/2016	12/31/2015	Percent Change
1. Actuarial accrued liability	\$463.7	\$465.6	(0.4%)	\$67.9	\$67.8	0.1%
2. Actuarial value of assets	\$465.0	\$419.3	10.9%	\$19.1	\$11.2	70.9%
3. Unfunded accrued liability	(\$1.3)	\$46.3	(102.9%)	\$48.8	\$56.6	(13.8%)
4. Funded percentage (2. ÷ 1.)	100.3%	90.0%	11.4%	28.1%	16.5%	70.7%
5. Combined valuation payroll	\$9,872.6	\$9,544.1	3.4%	\$2,881.4	\$2,831.8	1.8%
6. Unfunded accrued liability as % of combined valuation payroll (3. ÷ 5.)	0.0%	0.5%		1.7%	2.0%	

Amounts in millions

Reconciliation of UAL Bases

Beginning with the December 31, 2007 actuarial valuation, each rate-setting valuation establishes a 10-year amortization base for outstanding RHIA and RHIPA UAL amounts. For odd-year valuations subsequent to December 31, 2007, this amortization base is calculated based on the total UAL as of that valuation date less the remaining unamortized balance of any UAL bases established at previous odd-year valuation dates. In other words, RHIA and RHIPA experience from December 31, 2013 to December 31, 2015 is amortized based on a 10-year amortization schedule beginning December 31, 2015.

This even-year advisory valuation shows both the progress of the amortization bases established in prior valuations and an estimate of the base to be established on December 31, 2017, with the estimate based on experience during 2016. The payment schedules for the unamortized UAL balances as of December 31, 2016, have been modified to reflect the lowering of the investment return assumption first effective with this valuation.

<i>RHIA</i>					
Amortization Base	UAL, December 31, 2015	Payment	Interest	UAL, December 31, 2016	Next Year's Payment
December 31, 2007	\$81.7	\$43.0	\$4.4	\$43.1	\$44.5
December 31, 2009	\$34.8	\$9.5	\$2.2	\$27.5	\$9.8
December 31, 2011	(\$23.2)	(\$4.4)	(\$1.6)	(\$20.4)	(\$4.5)
December 31, 2013	(\$40.6)	(\$6.0)	(\$2.8)	(\$37.4)	(\$6.1)
December 31, 2015	(\$6.3)	(\$0.8)	(\$0.4)	(\$6.0)	(\$0.8)
December 31, 2016	N/A	N/A	N/A	(\$8.1)	(\$1.0)
Total	\$46.3	\$41.4	\$1.8	(\$1.3)	\$41.9

Amounts in millions

<i>RHIPA</i>					
Amortization Base	UAL, December 31, 2015	Payment	Interest	UAL, December 31, 2016	Next Year's Payment
December 31, 2007	\$5.6	\$2.9	\$0.3	\$2.9	\$3.0
December 31, 2009	\$1.2	\$0.3	\$0.1	\$0.9	\$0.3
December 31, 2011	\$10.8	\$2.0	\$0.7	\$9.5	\$2.1
December 31, 2013	\$27.9	\$4.1	\$1.9	\$25.7	\$4.2
December 31, 2015	\$11.1	\$1.4	\$0.8	\$10.5	\$1.4
December 31, 2016	N/A	N/A	N/A	(\$0.9)	(\$0.1)
Total	\$56.6	\$10.8	\$3.8	\$48.8	\$11.0

Amounts in millions

Actuarial Gain or Loss since Prior Valuation

In every actuarial valuation, assumptions are made as to the future experience of the plan and covered group of participants. Whenever there is a difference between the actual experience and that anticipated by the actuarial assumptions, there is an actuarial gain or loss to the plan. Gains are the result of experience that is more financially favorable to the system than anticipated (i.e., serves to reduce the unfunded accrued liability or increase the surplus), while losses are the result of experience that is financially unfavorable to the system.

The table below shows the development of the actuarial gain (or loss) for RHIA and RHIPA for the plan year ending December 31, 2016.

	RHIA	RHIPA	Retiree Healthcare Totals
Retiree Healthcare			
1. Expected actuarial accrued liability			
a. Actuarial accrued liability at December 31, 2015	\$465.6	\$67.8	\$533.4
b. Normal cost at December 31, 2015	\$3.3	\$1.5	\$4.8
c. Benefit payments for fiscal year ending December 31, 2016	(\$32.4)	(\$4.3)	(\$36.7)
d. Interest	\$33.8	\$5.0	\$38.8
e. Expected actuarial accrued liability before changes (a. + b. + c. + d.)	\$470.4	\$69.9	\$540.3
f. Change in actuarial accrued liability at December 31, 2016, due to assumption and method changes	\$1.5	\$0.7	\$2.1
g. Change in actuarial accrued liability at December 31, 2016, due to plan changes	\$0.0	\$0.0	\$0.0
h. Expected actuarial accrued liability at December 31, 2016 (e. + f. + g.)	\$471.9	\$70.6	\$542.5
2. Actuarial accrued liability at December 31, 2016	\$463.7	\$67.9	\$531.6
3. Liability gain/(loss) (1.h. - 2.)	\$8.2	\$2.7	\$10.9
4. Expected actuarial value of assets			
a. Actuarial value of assets at December 31, 2015	\$419.3	\$11.2	\$430.5
b. Actual contributions for 2016	\$48.3	\$11.6	\$60.0
c. Benefit payments and expenses for fiscal year ending December 31, 2016	(\$33.6)	(\$4.6)	(\$38.2)
d. Assumed investment return	\$32.0	\$1.1	\$33.1
e. Expected actuarial value of assets before changes (a. + b. + c. + d.)	\$466.0	\$19.3	\$485.3
f. Change in actuarial value of assets at December 31, 2016, due to assumption changes	\$0.0	\$0.0	\$0.0
g. Change in actuarial value of assets at December 31, 2016, due to plan changes	\$0.0	\$0.0	\$0.0
h. Expected actuarial value of assets at December 31, 2016 (e. + f. + g.)	\$466.0	\$19.3	\$485.3
5. Actuarial value of assets at December 31, 2016	\$465.0	\$19.1	\$484.1
6. Actuarial asset gain/(loss) (5. - 4.h.)	(\$1.0)	(\$0.2)	(\$1.2)
7. Net actuarial gain/(loss) (3. + 6.)	\$7.2	\$2.5	\$9.7

Amounts in millions

Reconciliation of UAL

The table below summarizes the changes in UAL since the prior valuation.

The significant decrease in the RHIA UAL is primarily due to employer contributions and lower participation than previously assumed.

The decrease in the RHIPA UAL is primarily due to employer contributions.

	RHIA	RHIPA
UAL, December 31, 2015	\$46.3	\$56.6
Normal Cost (including actual administrative expenses)	\$4.5	\$1.8
Contributions	(\$48.3)	(\$11.6)
Liability (gain) or loss	(\$8.2)	(\$2.7)
Asset (gain) or loss	\$1.0	\$0.2
Assumption and method changes	\$1.5	\$0.7
Interest	\$1.8	\$3.9
UAL, December 31, 2016	(\$1.3)	\$48.8

Amounts in millions

Retiree Healthcare Contribution Rate Development

Normal Cost Rate

The table below shows the development of the retiree healthcare normal cost rates. For RHIA, valuation payroll is shown on a system-wide basis. For RHIPA, valuation payroll is for the State of Oregon and the State Judiciary only.

	RHIA		RHIPA	
	December 31, 2016	December 31, 2015	December 31, 2016	December 31, 2015
Normal Cost	\$3.0	\$3.3	\$1.5	\$1.5
Tier 1/Tier 2 Valuation Payroll	\$4,516.7	\$4,730.8	\$1,276.0	\$1,339.4
Normal Cost Rate	0.07%	0.07%	0.12%	0.11%

Amounts in millions

The table below shows the development of the retiree healthcare normal cost rates for the various rate pools. For RHIA, valuation payroll is shown on a system-wide basis. For RHIPA, valuation payroll is for the State of Oregon and the State Judiciary only. For this exhibit, all independent employers, including State Judiciary, have been grouped together.

	December 31, 2016			
	SLGRP	School Districts	Independent Employers	Retiree Healthcare Total
1. Tier 1/ Tier 2 Valuation Payroll				
a. All Employers' Payroll	\$2,546.7	\$1,532.7	\$437.3	\$4,516.7
b. RHIPA Employers' Payroll	\$1,252.5	\$0.0	\$23.5	\$1,276.0
2. Normal Cost Rate				
a. RHIA	0.07%	0.07%	0.07%	0.07%
b. RHIPA	0.12%	0.00%	0.12%	0.12%
3. Weighted Average Normal Cost Rate [(1.a. x 2.a + 1.b. x 2.b.) / 1.a]	0.13%	0.07%	0.08%	0.10%

Amounts in millions

UAL Rate

The UAL rate is determined by calculating the sum of next year's scheduled amortization payments to the UAL as a percentage of combined (Tier 1/Tier 2 and OPSRP) valuation payroll. For RHIPA, valuation payroll is for the State of Oregon and the State Judiciary only.

	RHIA		RHIPA	
	December 31, 2016	December 31, 2015	December 31, 2016	December 31, 2015
1. Total UAL	(\$1.3)	\$46.3	\$48.8	\$56.6
2. Next year's UAL payment	\$41.9	\$41.4	\$11.0	\$10.8
3. Combined valuation payroll	\$9,872.6	\$9,544.1	\$2,881.4	\$2,831.8
4. UAL rate (2 ÷ 3)	0.42%	0.43%	0.38%	0.38%

Amounts in millions

The table below shows the development of the retiree healthcare UAL rates for the various rate pools. For RHIA, combined valuation payroll is shown on a system-wide basis. For RHIPA, valuation payroll is for the State of Oregon and the State Judiciary only. For this exhibit, all independent employers, including State Judiciary, have been grouped together.

	December 31, 2016			
	SLGRP	School Districts	Independent Employers	Retiree Healthcare Total
1. Combined Valuation Payroll				
a. All Employers' Payroll	\$5,714.0	\$3,240.7	\$917.8	\$9,872.6
b. RHIPA Employers' Payroll	\$2,857.9	\$0.0	\$23.5	\$2,881.4
2. UAL Rate				
a. RHIA	0.42%	0.42%	0.42%	0.42%
b. RHIPA	0.38%	0.00%	0.38%	0.38%
3. Weighted Average UAL Rate [(1.a. x 2.a + 1.b. x 2.b.) / 1.a]	0.61%	0.42%	0.43%	0.53%

Amounts in millions

Calculated Employer Contribution Rate Summary

The following table summarizes the calculated employer contribution rates for the retiree healthcare programs. The normal cost rates are applied against Tier 1/Tier 2 payroll, but the UAL rates are applied against all payroll. For RHIPA, valuation payroll is for the State of Oregon and the State Judiciary only.

	Advisory July 1, 2019 Rates Calculated as of December 31, 2016		
	State Agencies and Judiciary	All Other Employers	Retiree Healthcare Total
Normal Cost Rates			
RHIA	0.07%	0.07%	0.07%
RHIPA	0.12%	0.00%	0.03%
Total normal cost rate	0.19%	0.07%	0.10%
UAL Rates			
RHIA	0.42%	0.42%	0.42%
RHIPA	0.38%	0.00%	0.11%
Total UAL rate	0.80%	0.42%	0.53%
Total retiree healthcare rate	0.99%	0.49%	0.63%

Accounting / CAFR Exhibits

Accounting/CAFR Exhibits

The following information as of December 31, 2016 has been prepared and provided to Oregon PERS for inclusion in the Actuarial Section of the 2017 Comprehensive Annual Financial Report (CAFR):

- Schedule of Active Member Valuation Data
- Schedule of Retirees and Beneficiaries Added to and Removed from Rolls
- Schedules of Funding Progress by Rate Pool
- Solvency Test
- Analysis of Financial Experience
- Schedules of Funding Progress

These exhibits do not reflect GASB Statements No. 74 and 75, which were issued by GASB in June 2015 to replace Statements No. 43 and 45, and govern financial reporting for postemployment benefits other than pensions. GASB 74 governs plan reporting effective for fiscal years beginning after June 15, 2016, while GASB 75 governs employer reporting for fiscal years beginning after June 15, 2017. Accounting information under GASB 74 and 75 will be provided separately and is not included in this report.

These exhibits do not reflect GASB Statements No. 67 and 68, issued by GASB in June 2012 to replace Statements No. 25 and 27. GASB 67 governs plan financial reporting effective for fiscal years beginning after June 15, 2013, while GASB 68 governs employer financial reporting for fiscal years beginning after June 15, 2014. Milliman provided results for Oregon PERS under GASB 67 and 68 determined as of a June 30, 2016 measurement date in letters dated November 22, 2016 and February 8, 2017, respectively. The results for a measurement date of June 30, 2017 will be provided separately.

Some employers have made supplemental deposits in addition to their regularly scheduled contributions. These deposits are placed in a side account within the pension trust and used to offset future contribution requirements of that employer. The Schedules of Funding Progress and Solvency Test include side accounts as part of the Plan's assets since those amounts are in a restricted trust available exclusively for the benefit of plan members.

Milliman is not an accounting or audit firm and cannot provide accounting advice. Milliman is not responsible for the interpretation of, or compliance with, accounting standards; citations to, and descriptions of accounting standards provided in this report are for reference purposes only. The information provided in this section is intended to assist Oregon PERS in completing its financial statements, but any accounting determination should be reviewed by your auditor.

The exhibits are provided on the following pages.

Actuarial Schedules

Schedule of Active Member Valuation Data

Valuation Date	Count	Annual Payroll (in Thousands)	Average Annual Pay	% Increase in Average Pay	Number of Participating Employers ¹	
12/31/1993	137,513	\$4,466,797	\$32,483		N/A	
12/31/1995	141,471	\$4,848,058	\$34,269	5.5%	N/A	
12/31/1997	143,194	\$5,161,562	\$36,045	5.2%	N/A	
12/31/1999	151,262	\$5,676,606	\$37,528	4.1%	N/A	
12/31/2000	156,869	\$6,195,862	\$39,497	5.2%	N/A	
12/31/2001	160,477	\$6,520,225	\$40,630	2.9%	N/A	Old Basis
12/31/2001	160,477	\$6,253,965	\$38,971	—	N/A	New Basis ²
12/31/2002	159,287	\$6,383,475	\$40,075	2.8%	N/A	
12/31/2003	153,723	\$6,248,550	\$40,648	1.4%	N/A	
12/31/2004	142,635	\$6,306,447	\$44,214	8.8%	806	
12/31/2005 ³	156,501	\$6,791,891	\$43,398	-1.8%	810	
12/31/2006	163,261	\$7,326,798	\$44,878	3.4%	758	
12/31/2007	167,023	\$7,721,819	\$46,232	3.0%	760	
12/31/2008	170,569	\$8,130,136	\$47,665	3.1%	766	
12/31/2009	178,606	\$8,512,192	\$47,659	0.0%	776	
12/31/2010	193,569	\$8,750,064	\$45,204	-5.2%	787	
12/31/2011	170,972	\$8,550,511	\$50,011	10.6%	791	
12/31/2012	167,103	\$8,590,879	\$51,411	2.8%	798	
12/31/2013	162,185	\$8,671,835	\$53,469	4.0%	799	
12/31/2014	164,859	\$9,115,767	\$55,294	3.4%	802	
12/31/2015	168,177	\$9,544,132	\$56,751	2.6%	804	
12/31/2016	172,483	\$9,872,557	\$57,238	0.9%	805	

¹ Effective in 2006, participating employers are defined for this purpose as any employer with covered payroll during the prior year. In prior years, employers with liabilities but without covered payroll were included as well.

² Effective in 2001, the Annual Payroll excludes the member pick-up, if any.

³ Effective with the 12/31/2005 valuation, OPSRP members and payroll are included.

Actuarial Schedules

Schedule of Retirees and Beneficiaries Added to and Removed from Rolls

Annual Allowances are shown in thousands.

Valuation Date	Added to Rolls		Removed from Rolls		Rolls - End of Year		% Increase in Annual Allowances ²	Average Annual Allowances
	Count	Annual Allowances ¹	Count	Annual Allowances	Count	Annual Allowances		
12/31/1993					60,841	\$564,341	27.6%	\$9,276
12/31/1995					64,796	\$700,171	24.1%	\$10,806
12/31/1997					69,624	\$919,038	31.3%	\$13,200
12/31/1999					82,819	\$1,299,380	41.4%	\$15,689
12/31/2000					82,458	\$1,385,556	6.6%	\$16,803
12/31/2001					85,216	\$1,514,491	9.3%	\$17,772
12/31/2002					89,482	\$1,722,865	13.8%	\$19,254
12/31/2003					97,777	\$2,040,533	8.4%	\$20,869
12/31/2004 ³	6,754	\$149,474	2,863	\$35,151	101,668	\$2,154,856	5.6%	\$21,195
12/31/2005 ³	4,472	\$149,127	3,217	\$36,784	102,923	\$2,267,198	5.2%	\$22,028
12/31/2006 ³	5,060	\$151,240	3,263	\$39,735	104,720	\$2,378,704	4.9%	\$22,715
12/31/2007 ³	5,385	\$183,232	3,304	\$40,590	106,801	\$2,521,345	6.0%	\$23,608
12/31/2008 ³	5,963	\$171,484	3,626	\$47,062	109,138	\$2,645,767	4.9%	\$24,242
12/31/2009 ³	6,377	\$226,713	3,374	\$46,228	112,141	\$2,826,252	6.8%	\$25,203
12/31/2010 ³	6,359	\$217,424	3,512	\$51,627	114,988	\$2,992,048	5.9%	\$26,021
12/31/2011 ³	8,715	\$282,098	3,679	\$55,633	120,024	\$3,218,514	7.6%	\$26,816
12/31/2012 ³	7,023	\$235,917	4,875	\$59,353	122,172	\$3,395,079	5.5%	\$27,789
12/31/2013	9,724	\$307,551	3,644	\$66,607	128,252	\$3,636,023	7.1%	\$28,351
12/31/2014 ⁴	6,910	\$235,250	3,524	\$66,621	131,638	\$3,804,651	4.6%	\$28,902
12/31/2015 ⁴	8,566	\$304,818	3,781	\$73,305	136,423	\$4,036,165	6.1%	\$29,586
12/31/2016 ⁴	6,413	\$242,372	3,931	\$80,903	138,905	\$4,197,633	4.0%	\$30,219

¹ Additions to annual allowances reflect the combined effects of new retirements and COLA increases since the previous valuation date.

² Since last valuation date.

³ Annual allowances reflect estimated adjustments to retiree benefits due to the implementation of the Strunk v. PERB, et al. and City of Eugene v. State of Oregon, PERB, et al. decisions.

⁴ Annual allowances reflect estimated adjustments to retiree benefits for the Moro v. State of Oregon decision for records that were not already adjusted in the data provided.

Actuarial Schedules

Schedule of Funding Progress by Rate Pool

The liabilities and assets resulting from the last six actuarial valuations are as follows (*dollar amounts in millions*):

Actuarial Valuation Date	Actuarial Value of Assets ^{1,2} (a)	Actuarial Liability (AAL) ² (b)	Unfunded AAL (UAAL) (b-a)	Funded Ratio (a/b)	Covered Payroll ³ (c)	UAAL as a % of Covered Payroll ((b-a)/c)
Tier 1/Tier 2 State & Local Government Rate Pool						
12/31/2011 ⁴	\$25,679.2	\$31,109.1	\$5,429.9	82.5%	\$3,179.3	170.8%
12/31/2012 ⁵	\$28,022.3	\$30,601.9	\$2,579.5	91.6%	\$3,043.7	84.7%
12/31/2013 ⁴	\$30,590.2	\$31,738.8	\$1,148.6	96.4%	\$2,915.9	39.4%
12/31/2014 ⁶	\$31,162.6	\$37,169.9	\$6,007.3	83.8%	\$2,827.9	212.4%
12/31/2015 ⁴	\$30,185.3	\$38,396.8	\$8,211.5	78.6%	\$2,691.8	305.1%
12/31/2016	\$30,417.6	\$40,351.3	\$9,933.7	75.4%	\$2,546.7	390.1%
Tier 1/Tier 2 School District Rate Pool						
12/31/2011	\$19,668.2	\$23,973.7	\$4,305.5	82.0%	\$1,880.7	228.9%
12/31/2012 ⁵	\$21,202.1	\$22,908.0	\$1,705.8	92.6%	\$1,769.0	96.4%
12/31/2013	\$23,063.3	\$23,392.6	\$329.4	98.6%	\$1,663.0	19.8%
12/31/2014 ⁶	\$23,361.2	\$27,059.9	\$3,698.7	86.3%	\$1,626.0	227.5%
12/31/2015	\$22,728.9	\$27,670.7	\$4,941.8	82.1%	\$1,578.8	313.0%
12/31/2016	\$22,870.2	\$29,152.2	\$6,282.0	78.5%	\$1,532.7	409.9%
Tier 1/Tier 2 Independent Employers and Judiciary						
12/31/2011 ⁴	\$4,083.2	\$5,069.8	\$986.6	80.5%	\$547.9	180.1%
12/31/2012 ⁵	\$4,479.4	\$5,043.4	\$564.0	88.8%	\$529.0	106.6%
12/31/2013 ⁴	\$4,851.0	\$5,164.3	\$313.3	93.9%	\$494.8	63.3%
12/31/2014 ⁶	\$4,967.4	\$6,104.9	\$1,137.4	81.4%	\$479.2	237.4%
12/31/2015 ⁴	\$4,807.6	\$6,327.1	\$1,519.5	76.0%	\$460.3	330.1%
12/31/2016	\$4,856.6	\$6,690.8	\$1,834.3	72.6%	\$437.3	419.5%
OPSRP Rate Pool						
12/31/2011	\$840.5	\$986.4	\$145.9	85.2%	\$2,942.6	5.0%
12/31/2012 ⁵	\$1,190.0	\$1,795.6	\$605.5	66.3%	\$3,249.2	18.6%
12/31/2013	\$1,630.2	\$2,243.3	\$613.2	72.7%	\$3,598.1	17.0%
12/31/2014 ⁶	\$2,024.6	\$3,064.1	\$1,039.5	66.1%	\$4,182.7	24.9%
12/31/2015	\$2,389.1	\$3,742.5	\$1,353.5	63.8%	\$4,813.3	28.1%
12/31/2016	\$3,021.4	\$4,717.0	\$1,695.6	64.1%	\$5,355.8	31.7%
Postemployment Healthcare Benefits - Retirement Health Insurance Account						
12/31/2011	\$239.6	\$461.1	\$221.5	52.0%	\$5,607.9	3.9%
12/31/2012	\$291.6	\$471.8	\$180.2	61.8%	\$5,341.7	3.4%
12/31/2013	\$353.5	\$473.6	\$120.0	74.7%	\$5,073.7	2.4%
12/31/2014	\$395.9	\$468.4	\$72.5	84.5%	\$4,933.1	1.5%
12/31/2015	\$419.3	\$465.6	\$46.3	90.0%	\$4,730.8	1.0%
12/31/2016	\$465.0	\$463.7	(\$1.3)	100.3%	\$4,516.7	(0.0%)
Postemployment Healthcare Benefits - Retiree Health Insurance Premium Account						
12/31/2011	\$4.5	\$34.4	\$29.9	13.2%	\$1,539.5	1.9%
12/31/2012	\$4.4	\$60.3	\$55.9	7.4%	\$1,478.4	3.8%
12/31/2013	\$5.2	\$61.2	\$55.9	8.6%	\$1,434.5	3.9%
12/31/2014	\$7.2	\$70.5	\$63.3	10.2%	\$1,406.3	4.5%
12/31/2015	\$11.2	\$67.8	\$56.6	16.5%	\$1,339.4	4.2%
12/31/2016	\$19.1	\$67.9	\$48.8	28.1%	\$1,276.0	3.8%

Notes:

¹ Side account assets are included with Tier 1/Tier 2 assets.

² Excludes effect of Multnomah Fire District (net UAAL of \$166 million as of 12/31/2016).

³ Covered payroll shown is for members of the rate pool benefiting from the specified program. For example, Tier 1/Tier 2 School District payroll is only payroll for Tier 1/Tier 2 members and excludes OPSRP. However, UAAL is amortized using combined Tier 1/Tier 2 and OPSRP payroll.

⁴ Reflects the transfer in assets and liabilities for new employers that joined the SLGRP effective January 1 following the valuation date.

⁵ The 12/31/2012 valuation reflects the benefit changes enacted by the 2013 Oregon Legislature in Senate Bills 822 and 861, as well as a change in cost method to Entry Age Normal.

⁶ The 12/31/2014 valuation reflects benefit changes from the Oregon Supreme Court's ruling in *Moro v. State of Oregon*, which overturned portions of Senate Bills 822 and 861.

Actuarial Schedules

Solvency Test

Pension and Retiree Healthcare Plans Combined

(dollar amounts in millions)

The schedule below shows results from the defined benefit pension plans and retiree healthcare plans on a consolidated basis. Results are also shown separately for each program: Tier 1/Tier 2, OPSRP, and retiree healthcare. Note that the defined benefit pension plan constitutes over 99% of the consolidated assets and liabilities.

Actuarial Accrued Liability ¹							
Valuation Date ²	Active Member Contributions (1)	Retired Members and Beneficiaries (2)	Other Members (3)	Valuation Assets ^{1,3}	Portion of Actuarial Accrued Liabilities Covered by Assets		
					(1)	(2)	(3)
12/31/2007 ⁴	\$9,225.0	\$29,157.3	\$15,011.8	\$59,586.4	100%	100%	141%
12/31/2008	\$8,341.5	\$30,537.7	\$15,895.7	\$43,710.2	100%	100%	30%
12/31/2009 ⁴	\$8,392.0	\$32,484.2	\$16,470.1	\$48,949.7	100%	100%	49%
12/31/2010	\$8,407.9	\$34,432.5	\$17,070.2	\$51,821.6	100%	100%	53%
12/31/2011 ⁴	\$7,779.7	\$37,362.4	\$16,551.8	\$50,412.4	100%	100%	32%
12/31/2012 ⁵	\$7,704.9	\$36,759.3	\$16,473.1	\$55,080.1	100%	100%	64%
12/31/2013 ⁴	\$7,120.1	\$39,531.5	\$16,476.8	\$60,372.9	100%	100%	83%
12/31/2014 ⁶	\$6,950.4	\$46,576.7	\$20,470.8	\$61,798.3	100%	100%	40%
12/31/2015 ⁴	\$6,476.8	\$49,158.7	\$21,094.5	\$60,430.6	100%	100%	23%
12/31/2016	\$6,168.1	\$52,232.7	\$23,101.0	\$61,543.2	100%	100%	14%

¹ Includes effect of Multnomah Fire District (net UAAL of \$166 million as of 12/31/2016).

² An extensive revision of the actuarial assumptions occurs prior to each odd-year valuation; therefore, the figures are not directly comparable. Effective with the 12/31/2006 valuation, revisions to actuarial assumptions occur prior to each even-year valuation.

³ Effective with the 12/31/2002 valuation, includes the value of UAL Lump Sum Side Accounts.

⁴ Reflects the transfer in assets and liabilities for new employers that joined the SLGRP effective January 1 following the valuation date.

⁵ The 12/31/2012 valuation reflects the benefit changes enacted by the 2013 Oregon Legislature in Senate Bills 822 and 861, as well as a change in cost method to Entry Age Normal.

⁶ The 12/31/2014 valuation reflects benefit changes from the Oregon Supreme Court's ruling in *Moro v. State of Oregon*, which overturned portions of Senate Bills 822 and 861.

Actuarial Schedules

Solvency Test

Tier 1/Tier 2 Pension

(dollar amounts in millions)

Actuarial Accrued Liability							
Valuation Date	Active Member Contributions (1)	Retired Members and Beneficiaries (2)	Other Members (3)	Valuation Assets	Portion of Actuarial Accrued Liabilities Covered by Assets		
					(1)	(2)	(3)
12/31/2011 ¹	\$ 7,779.7	\$ 37,001.1	\$ 15,431.2	\$ 49,327.7	100%	100%	29%
12/31/2012 ²	\$ 7,704.9	\$ 36,377.3	\$ 14,527.4	\$ 53,594.0	100%	100%	65%
12/31/2013 ¹	\$ 7,120.1	\$ 39,116.2	\$ 14,114.1	\$ 58,384.0	100%	100%	86%
12/31/2014 ³	\$ 6,950.4	\$ 46,113.5	\$ 17,331.0	\$ 59,370.6	100%	100%	36%
12/31/2015 ¹	\$ 6,476.8	\$ 48,641.5	\$ 17,335.7	\$ 57,611.0	100%	100%	14%
12/31/2016	\$ 6,168.1	\$ 51,655.5	\$ 18,429.6	\$ 58,037.6	100%	100%	1%

¹ Reflects the transfer in assets and liabilities for new employers that joined the SLGRP effective January 1 following the valuation date.

² The 12/31/2012 valuation reflects the benefit changes enacted by the 2013 Oregon Legislature in Senate Bills 822 and 861, as well as a change in cost method to Entry Age Normal.

³ The 12/31/2014 valuation reflects benefit changes from the Oregon Supreme Court's ruling in *Moro v. State of Oregon*, which overturned portions of Senate Bills 822 and 861.

OPSRP Pension

(dollar amounts in millions)

Actuarial Accrued Liability							
Valuation Date	Active Member Contributions (1)	Retired Members and Beneficiaries (2)	Other Members (3)	Valuation Assets	Portion of Actuarial Accrued Liabilities Covered by Assets		
					(1)	(2)	(3)
12/31/2011	\$0.0	\$15.2	\$971.3	\$840.5	100%	100%	85%
12/31/2012 ¹	\$0.0	\$28.6	\$1,766.9	\$1,190.0	100%	100%	66%
12/31/2013	\$0.0	\$51.2	\$2,192.1	\$1,630.2	100%	100%	72%
12/31/2014 ²	\$0.0	\$92.4	\$2,971.6	\$2,024.6	100%	100%	65%
12/31/2015	\$0.0	\$144.6	\$3,597.9	\$2,389.1	100%	100%	62%
12/31/2016	\$0.0	\$201.1	\$4,515.9	\$3,021.4	100%	100%	62%

¹ The 12/31/2012 valuation reflects the benefit changes enacted by the 2013 Oregon Legislature in Senate Bills 822 and 861, as well as a change in cost method to Entry Age Normal.

² The 12/31/2014 valuation reflects benefit changes from the Oregon Supreme Court's ruling in *Moro v. State of Oregon*, which overturned portions of Senate Bills 822 and 861.

Retiree Healthcare (RHIA and RHIPA)

(dollar amounts in millions)

Retiree Health Insurance Account (RHIA)								
Actuarial Accrued Liability								
Valuation Date	Active Member Contributions (1)	Retired Members and Beneficiaries (2)	Other Members (3)	Valuation Assets	Portion of Actuarial Accrued Liabilities Covered by Assets			
					(1)	(2)	(3)	
12/31/2011	\$ 0.0	\$ 332.5	\$ 128.6	\$ 239.6	0%	72%	0%	
12/31/2012 ¹	\$ 0.0	\$ 338.3	\$ 133.5	\$ 291.6	0%	86%	0%	
12/31/2013	\$ 0.0	\$ 348.0	\$ 125.6	\$ 353.5	0%	100%	4%	
12/31/2014	\$ 0.0	\$ 355.1	\$ 113.3	\$ 395.9	0%	100%	36%	
12/31/2015	\$ 0.0	\$ 357.7	\$ 107.9	\$ 419.3	0%	100%	57%	
12/31/2016	\$ 0.0	\$ 361.7	\$ 102.0	\$ 465.0	0%	100%	101%	

¹ The 12/31/2012 valuation reflects a change in cost method to Entry Age Normal.

Retiree Health Insurance Premium Account (RHIPA)								
Actuarial Accrued Liability								
Valuation Date	Active Member Contributions (1)	Retired Members and Beneficiaries (2)	Other Members (3)	Valuation Assets	Portion of Actuarial Accrued Liabilities Covered by Assets			
					(1)	(2)	(3)	
12/31/2011	\$0.0	\$13.6	\$20.8	\$4.5	0%	33%	0%	
12/31/2012 ¹	\$0.0	\$15.1	\$45.3	\$4.4	0%	29%	0%	
12/31/2013	\$0.0	\$16.1	\$45.1	\$5.2	0%	33%	0%	
12/31/2014	\$0.0	\$15.7	\$54.9	\$7.2	0%	46%	0%	
12/31/2015	\$0.0	\$14.9	\$52.9	\$11.2	0%	75%	0%	
12/31/2016	\$0.0	\$14.4	\$53.5	\$19.1	0%	100%	9%	

¹ The 12/31/2012 valuation reflects a change in cost method to Entry Age Normal.

Actuarial Schedules

Analysis of Financial Experience

The schedule below shows results from the defined benefit pension plans and retiree healthcare plans on a consolidated basis. Results are also shown separately for each program on subsequent pages.

Gains and Losses in Unfunded Accrued Liability Resulting from Differences Between Assumed Experience and Actual Experience and Assumption Changes

(dollar amounts in millions)

Pension and Retiree Healthcare Plans	\$ Gain (or Loss) for Year	
	2016	2015
<i>Type of Activity</i>		
Retirements from Active Status	\$69.0	(\$58.2)
Active Mortality and Withdrawal	(88.4)	(44.9)
Pay Increases	37.0	(69.0)
Contributions	98.5	48.7
Interest Crediting Experience	(5.4)	53.5
Investment Income	(38.5)	(2,648.3)
Retirement, Mortality and Lump Sums from Dormant Status	(0.4)	2.8
Retiree and Beneficiary Mortality	(5.9)	(113.6)
COLA Experience	0.0	0.0
New Entrants	(80.2)	(82.5)
Other	0.3	(12.2)
Gain (or Loss) During Year From Financial Experience	(\$14.1)	(\$2,923.7)
<i>Non-Recurring Items</i>		
Assumption Changes	(2,272.3)	0.0
Plan Changes	0.0	0.0
Composite Gain (or Loss) During Year	(\$2,286.3)	(\$2,923.7)

The schedules below show results from the Tier 1/Tier 2 and OPSRP pension programs separately.

Gains and Losses in Unfunded Accrued Liability Resulting from Differences between Assumed Experience and Actual Experience and Assumption Changes

Tier 1/Tier 2 Pension Program	\$ Gain (or Loss) for Year	
	2016	2015
Type of Activity		
Retirements from Active Status	\$66.9	(\$65.5)
Active Mortality and Withdrawal	(65.7)	(25.3)
Pay Increases	36.6	(48.3)
Contributions	78.4	46.1
Interest Crediting Experience	(5.4)	53.5
Investment Income	(46.8)	(2,510.3)
Retirement, Mortality and Lump Sums from Dormant Status	(1.8)	(0.2)
Retiree and Beneficiary Mortality	(6.5)	(114.4)
New Entrants	(0.5)	(0.0)
Other	7.8	(42.4)
Gain (or Loss) During Year From Financial Experience	\$62.9	(\$2,706.8)
Non-Recurring Items		
Assumption Changes	(2,096.4)	0.0
Plan Changes	0.0	0.0
Composite Gain (or Loss) During Year	(\$2,033.5)	(\$2,706.8)

OPSRP Pension Program	\$ Gain (or Loss) for Year	
	2016	2015
Retirements from Active Status	\$2.1	\$7.3
Active Mortality and Withdrawal	(22.7)	(19.7)
Pay Increases	0.4	(20.7)
Contributions	18.0	0.8
Investment Income	9.5	(115.2)
Retirement, Mortality and Lump Sums from Dormant Status	1.3	3.0
Retiree and Beneficiary Mortality	0.6	0.8
New Entrants	(79.7)	(82.5)
Other	(18.4)	17.3
Gain (or Loss) During Year From Financial Experience	(\$88.8)	(\$208.8)
Non-Recurring Items		
Assumption Changes	(173.7)	0.0
Plan Changes	0.0	0.0
Composite Gain (or Loss) During Year	(\$262.5)	(\$208.8)

The schedule below shows results from the retiree healthcare programs.

Gains and Losses in Unfunded Accrued Liability Resulting from Differences Between Assumed Experience and Actual Experience and Assumption Changes

Retiree Healthcare Program	\$ Gain (or Loss) for Year	
	2016	2015
Contributions	\$2.1	\$1.8
Investment Income	(1.2)	(22.8)
Other	10.9	12.9
Gain (or Loss) During Year From Financial Experience	11.8	(8.1)
Non-Recurring Items		
Assumption Changes	(2.1)	0.0
Composite Gain (or Loss) During Year	\$9.7	(\$8.1)

Actuarial Schedules

Schedules of Funding Progress

(dollar amounts in millions)

Actuarial Valuation Date	Actuarial Value of Assets ¹ (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b-a)	Funded Ratio (a/b)	Covered Payroll (c)	UAAL as a % of Covered Payroll ((b-a)/c)
Pension Benefits - Tier 1/Tier 2 and OPSRP²						
12/31/2007 ³	59,327.8	52,871.2	(6,456.7)	112.2%	7,721.8	(83.6%)
12/31/2008	43,520.6	54,259.5	10,738.9	80.2%	8,130.1	132.1%
12/31/2009 ³	48,729.2	56,810.6	8,081.4	85.8%	8,512.2	94.9%
12/31/2010	51,583.6	59,329.5	7,746.0	86.9%	8,750.1	88.5%
12/31/2011 ³	50,168.2	61,198.4	11,030.2	82.0%	8,550.5	129.0%
12/31/2012 ⁴	54,784.1	60,405.2	5,621.1	90.7%	8,590.9	65.4%
12/31/2013 ³	60,014.1	62,593.6	2,579.5	95.9%	8,671.8	29.7%
12/31/2014 ⁵	61,395.2	73,458.9	12,063.7	83.6%	9,115.8	132.3%
12/31/2015 ³	60,000.1	76,196.6	16,196.5	78.7%	9,544.1	169.7%
12/31/2016	61,059.0	80,970.3	19,911.2	75.4%	9,872.6	201.7%
Postemployment Healthcare Benefits - Retirement Health Insurance Account						
12/31/2007	250.8	499.6	248.8	50.2%	7,721.8	3.2%
12/31/2008	183.8	494.0	310.2	37.2%	8,130.1	3.8%
12/31/2009	214.1	511.2	297.1	41.9%	8,512.2	3.5%
12/31/2010	232.3	547.1	314.8	42.5%	8,750.1	3.6%
12/31/2011	239.6	461.1	221.5	52.0%	8,550.5	2.6%
12/31/2012	291.6	471.8	180.2	61.8%	8,590.9	2.1%
12/31/2013	353.5	473.6	120.0	74.7%	8,671.8	1.4%
12/31/2014	395.9	468.4	72.5	84.5%	9,115.8	0.8%
12/31/2015	419.3	465.6	46.3	90.0%	9,544.1	0.5%
12/31/2016	465.0	463.7	(1.3)	100.3%	9,872.6	(0.0%)
Postemployment Healthcare Benefits - Retiree Health Insurance Premium Account						
12/31/2007	7.8	23.3	15.5	33.6%	2,080.2	0.7%
12/31/2008	5.7	21.3	15.6	26.7%	2,217.9	0.7%
12/31/2009	6.4	24.5	18.2	25.9%	2,371.8	0.8%
12/31/2010	5.7	33.9	28.2	16.8%	2,379.7	1.2%
12/31/2011	4.5	34.4	29.9	13.2%	2,376.9	1.3%
12/31/2012	4.4	60.3	55.9	7.4%	2,432.4	2.3%
12/31/2013	5.2	61.2	55.9	8.6%	2,531.5	2.2%
12/31/2014	7.2	70.5	63.3	10.2%	2,718.9	2.3%
12/31/2015	11.2	67.8	56.6	16.5%	2,831.8	2.0%
12/31/2016	19.1	67.9	48.8	28.1%	2,881.4	1.7%

Notes:

¹ Side account assets are included with pension assets.

² Includes UAAL for Multnomah Fire District (\$166 million as of 12/31/2016).

³ Reflects the transfer in assets and liabilities for new employers that joined the SLGRP effective January 1 following the valuation date.

⁴ The 12/31/2012 valuation reflects the benefit changes enacted by the 2013 Oregon Legislature in Senate Bills 822 and 861, as well as a change in cost method to Entry Age Normal.

⁵ The 12/31/2014 valuation reflects benefit changes from the Oregon Supreme Court's ruling in *Moro v. State of Oregon*, which overturned portions of Senate Bills 822 and 861.

Data Exhibits

This valuation is based upon the membership of the System as of December 31, 2016.

System Wide Data Exhibits

Valuation Pay and Census Exhibit

The following tables illustrate the breakdown of member counts and valuation payroll for the SLGRP, School District Pool, and independent employers.

SLGRP

	General Service	Police & Fire	Total
Tier 1	\$956.1	\$189.2	\$1,145.2
Tier 2	1,099.8	301.7	1,401.5
Tier 1/Tier 2 Valuation Payroll	2,055.9	490.8	2,546.7
OPSRP Valuation Payroll	2,682.2	485.1	3,167.3
Combined Valuation Payroll	\$4,738.1	\$976.0	\$5,714.0

Amounts in millions

	December 31				
	2016				2015
	Tier 1	Tier 2	OPSRP	Total	Total
Active Members in the Pool					
General Service	12,313	15,889	49,518	77,720	76,971
Police & Fire	2,007	3,560	6,882	12,449	12,158
Total	14,320	19,449	56,400	90,169	89,129
Average Age	56.2	51.1	42.5	46.5	46.6
Average Service	25.2	16.1	5.8	11.1	11.2
Average prior year Covered Salary	\$82,650	\$73,662	\$53,006	\$62,170	\$61,506
Active Members outside the Pool with previous Segments in the Pool					
General Service	3,343	3,469		6,812	5,679
Police & Fire	281	360		641	631
Total	3,624	3,829		7,453	6,310
Average Age	54.9	48.1		51.4	51.3
Average Service in the Pool	2.6	1.9		2.3	2.7
Inactive Members¹					
General Service	9,521	8,801	7,703	26,025	24,527
Police & Fire	675	706	559	1,940	1,780
Total	10,196	9,507	8,262	27,965	26,307
Average Age	58.6	53.0	47.4	53.4	52.9
Average Monthly Benefit	\$1,932	\$692	\$409	\$1,060	\$1,071
Retired Members and Beneficiaries¹					
General Service	64,857	6,439	1,763	73,059	71,531
Police & Fire	9,214	939	157	10,310	10,000
Total	74,071	7,378	1,920	83,369	81,531
Average Age	71.5	67.1	66.6	71.0	70.7
Average Monthly Benefit ²	\$2,284	\$934	\$448	\$2,122	\$2,078
Grand Total Number of Members	102,211	40,163	66,582	208,956	203,277

¹ In these exhibits, Inactives and Retirees are counted by members with service in each rate pool. As a result, individual members with service segments in more than one rate pool will be included in more than one exhibit.

² The average monthly benefit reflects an estimated adjustment for the effect of the Supreme Court decision in *Moro v. State of Oregon* for records that were not already adjusted in the data provided.

School District Pool

	General Service	Police & Fire	Total
Tier 1	\$647.0	\$0.8	\$647.9
Tier 2	883.5	1.4	884.9
Tier 1/Tier 2 Valuation Payroll	1,530.5	2.2	1,532.7
OPSRP Valuation Payroll	1,706.4	1.6	1,708.0
Combined Valuation Payroll	\$3,236.9	\$3.8	\$3,240.7

Amounts in millions

	December 31				
	2016				2015
	Tier 1	Tier 2	OPSRP	Total	Total
Active Members					
General Service	10,449	15,695	42,894	69,038	66,118
Police & Fire	14	22	29	65	66
Total	10,463	15,717	42,923	69,103	66,184
Average Age	55.7	50.5	42.7	46.4	46.7
Average Service	24.3	15.7	6.0	11.0	11.3
Average prior year Covered Salary	\$62,919	\$56,634	\$37,948	\$45,979	\$45,387
Active Members outside the Pool with previous Segments in the Pool					
General Service	1,383	1,452		2,835	2,692
Police & Fire	4	7		11	13
Total	1,387	1,459		2,846	2,705
Average Age	56.1	49.4		52.6	52.4
Average Service	5.1	3.6		4.3	4.7
Inactive Members¹					
General Service	6,016	6,816	5,481	18,313	17,365
Police & Fire	15	18	4	37	39
Total	6,031	6,834	5,485	18,350	17,404
Average Age	59.3	52.7	48.8	53.7	53.0
Average Monthly Benefit	\$1,537	\$513	\$307	\$788	\$810
Retired Members and Beneficiaries¹					
General Service	61,479	3,992	790	66,261	65,406
Police & Fire	191	34	5	230	220
Total	61,670	4,026	795	66,491	65,626
Average Age	72.6	66.6	66.6	72.2	71.8
Average Monthly Benefit ²	\$2,286	\$726	\$373	\$2,169	\$2,127
Grand Total Number of Members	79,551	28,036	49,203	156,790	151,919

¹ In these exhibits, Inactives and Retirees are counted by members with service in each rate pool. As a result, individual members with service segments in more than one rate pool will be included in more than one exhibit.

² The average monthly benefit reflects an estimated adjustment for the effect of the Supreme Court decision in *Moro v. State of Oregon* for records that were not already adjusted in the data provided.

Independents

	General Service	Police & Fire	Total
Tier 1	\$129.7	\$63.2	\$192.9
Tier 2	153.0	91.4	244.4
Tier 1/Tier 2 Valuation Payroll	282.8	154.5	437.3
OPSRP Valuation Payroll	357.9	122.6	480.5
Combined Valuation Payroll	\$640.7	\$277.2	\$917.8

Amounts in millions

	December 31				
	2016				2015
	Tier 1	Tier 2	OPSRP	Total	Total
Active Members					
General Service	1,600	2,180	6,427	10,207	9,887
Police & Fire	581	911	1,512	3,004	2,977
Total	2,181	3,091	7,939	13,211	12,864
Average Age	55.1	49.7	41.6	45.7	46.0
Average Service	23.7	16.1	5.8	11.2	11.4
Average prior year Covered Salary	\$91,432	\$80,250	\$57,027	\$68,141	\$67,703
Active Members outside the Pool with previous Segments in the Pool					
General Service	1,018	1,226		2,244	2,202
Police & Fire	241	322		563	551
Total	1,259	1,548		2,807	2,753
Average Age	54.4	48.2		51.0	50.6
Average Service	4.5	3.3		3.8	4.0
Inactive Members¹					
General Service	1,297	1,402	974	3,673	3,450
Police & Fire	229	194	101	524	463
Total	1,526	1,596	1,075	4,197	3,913
Average Age	57.6	52.7	48.5	53.4	52.9
Average Monthly Benefit	\$1,454	\$592	\$421	\$862	\$850
Retired Members and Beneficiaries¹					
General Service	9,278	1,167	231	10,676	10,356
Police & Fire	2,990	154	18	3,162	3,095
Total	12,268	1,321	249	13,838	13,451
Average Age	70.1	66.5	66.4	69.7	69.4
Average Monthly Benefit ²	\$2,238	\$829	\$444	\$2,071	\$2,030
Grand Total Number of Members	17,234	7,556	9,263	34,053	32,981

¹ In these exhibits, Inactives and Retirees are counted by members with service in each rate pool. As a result, individual members with service segments in more than one rate pool will be included in more than one exhibit.

² The average monthly benefit reflects an estimated adjustment for the effect of the Supreme Court decision in *Moro v. State of Oregon* for records that were not already adjusted in the data provided.

Total

	General Service	Police & Fire	Total
Tier 1	\$1,732.8	\$253.2	\$1,986.0
Tier 2	2,136.3	394.4	2,530.7
Tier 1/Tier 2 Valuation Payroll	3,869.2	647.5	4,516.7
OPSRP Valuation Payroll	4,746.4	609.4	5,355.8
Combined Valuation Payroll	\$8,615.6	\$1,256.9	\$9,872.6

Amounts in millions

	December 31				
	2016				2015
	Tier 1	Tier 2	OPSRP	Total	Total
Active Members					
General Service	24,362	33,764	98,839	156,965	152,976
Police & Fire	2,602	4,493	8,423	15,518	15,201
Total	26,964	38,257	107,262	172,483	168,177
Average Age	55.9	50.7	42.5	46.4	46.6
Average Service	24.8	16.0	5.9	11.1	11.2
Average prior year Covered Salary	\$75,704	\$67,199	\$47,278	\$56,140	\$55,637
Inactive Members¹					
General Service	16,834	17,019	14,158	48,011	45,342
Police & Fire	919	918	664	2,501	2,282
Total	17,753	17,937	14,822	50,512	47,624
Average Age	58.8	52.9	48.0	53.5	52.9
Average Monthly Benefit	\$1,756	\$615	\$372	\$945	\$957
Retired Members and Beneficiaries¹					
General Service	135,614	11,598	2,784	149,996	147,293
Police & Fire	12,395	1,127	180	13,702	13,315
Total	148,009	12,725	2,964	163,698	160,608
Average Age	71.9	66.9	66.6	71.4	71.0
Average Monthly Benefit ²	\$2,281	\$857	\$427	\$2,137	\$2,094
Grand Total Number of Members	192,726	68,919	125,048	386,693	376,409

¹ In these exhibits, Inactives and Retirees are counted by members with service in each rate pool. As a result, individual members with service segments in more than one rate pool are counted more than once in this exhibit.

² The average monthly benefit reflects an estimated adjustment for the effect of the Supreme Court decision in *Moro v. State of Oregon* for records that were not already adjusted in the data provided.

Age/Service and Prior Year Covered Payroll by Tier and Job Class

Tier 1 General Service Active Members

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
<20	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
30-34	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
35-39	0	0	0	4	9	0	0	0	0	13
\$	0	0	0	72,804	57,801	0	0	0	0	62,418
40-44	9	11	25	87	319	12	0	0	0	463
\$	89,230	56,558	56,529	66,648	70,366	74,116	0	0	0	69,056
45-49	18	63	96	360	2,187	419	10	0	0	3,153
\$	103,441	56,843	47,808	69,994	77,472	74,129	59,222	0	0	74,949
50-54	8	55	115	338	2,645	2,080	335	6	0	5,582
\$	106,615	63,198	55,142	65,220	75,907	78,968	75,621	66,139	0	75,864
55-59	7	66	115	343	2,919	2,556	1,157	197	1	7,361
\$	105,437	69,361	56,135	63,134	67,819	75,431	80,148	72,184	80,914	72,167
60-64	3	39	90	239	2,283	1,894	773	339	44	5,704
\$	87,180	56,149	63,068	61,372	64,022	74,113	81,133	79,052	69,737	70,461
65-69	2	10	31	73	663	564	246	112	32	1,733
\$	142,242	77,765	68,134	73,137	67,353	72,235	88,261	94,333	82,939	74,345
70-74	0	2	4	18	101	79	38	29	16	287
\$	0	11,371	31,782	75,395	62,872	77,209	76,521	81,860	111,119	73,227
75+	0	1	3	4	16	16	9	5	12	66
\$	0	36,205	54,563	64,364	53,131	65,972	74,165	79,049	98,393	69,795
Total	47	247	479	1,466	11,142	7,620	2,568	688	105	24,362
\$	102,170	61,876	56,114	65,899	70,827	75,757	80,475	79,579	83,448	73,072

Tier 2 General Service Active Members

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
<20	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
30-34	3	13	113	12	0	0	0	0	0	141
\$	24,516	62,170	52,253	63,853	0	0	0	0	0	53,564
35-39	7	122	1,603	695	5	0	0	0	0	2,432
\$	21,015	50,291	65,993	64,836	79,162	0	0	0	0	64,773
40-44	14	203	2,321	3,571	68	0	0	0	0	6,177
\$	16,862	44,279	67,227	72,800	74,382	0	0	0	0	69,659
45-49	12	164	1,981	4,131	187	0	0	0	0	6,475
\$	19,238	47,098	67,357	71,700	73,637	0	0	0	0	69,707
50-54	8	91	1,778	3,843	199	0	0	0	0	5,919
\$	20,271	46,270	61,159	66,084	71,794	0	0	0	0	64,430
55-59	3	69	1,728	4,132	222	0	0	0	0	6,154
\$	20,073	36,195	56,462	59,981	65,123	0	0	0	0	58,892
60-64	6	60	1,285	3,123	179	0	0	0	0	4,653
\$	27,681	44,070	57,123	59,167	65,862	0	0	0	0	58,625
65-69	11	30	430	921	46	0	0	0	0	1,438
\$	25,918	39,712	57,646	60,266	62,300	0	0	0	0	58,856
70-74	2	11	95	192	10	0	0	0	0	310
\$	29,205	38,886	51,968	57,726	56,845	0	0	0	0	55,081
75+	3	2	26	34	0	0	0	0	0	65
\$	9,273	49,146	41,070	43,024	0	0	0	0	0	40,873
Total	69	765	11,360	20,654	916	0	0	0	0	33,764
\$	20,976	45,394	62,646	65,683	68,987	0	0	0	0	64,200

Tier 1 Police and Fire Active Members

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
<20	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
30-34	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
35-39	0	0	0	0	2	0	0	0	0	2
\$	0	0	0	0	88,177	0	0	0	0	88,177
40-44	0	0	1	14	131	0	0	0	0	146
\$	0	0	68,796	88,594	104,490	0	0	0	0	102,721
45-49	0	1	5	31	679	126	0	0	0	842
\$	0	22,393	68,712	84,945	104,349	106,243	0	0	0	103,609
50-54	0	1	3	18	409	401	42	0	0	874
\$	0	52,089	86,204	95,871	103,141	103,779	106,212	0	0	103,315
55-59	0	0	4	6	175	193	72	14	0	464
\$	0	0	89,089	85,013	95,231	95,213	102,784	104,067	0	96,477
60-64	0	0	0	6	80	91	27	16	0	220
\$	0	0	0	93,266	84,509	86,444	97,156	90,734	0	87,553
65-69	0	0	0	3	9	18	5	1	3	39
\$	0	0	0	63,658	68,644	73,429	105,935	130,311	139,988	82,319
70-74	0	1	0	0	7	2	0	0	1	11
\$	0	43,944	0	0	59,200	99,698	0	0	133,916	71,969
75+	0	0	0	1	0	1	0	2	0	4
\$	0	0	0	95,155	0	79,029	0	100,246	0	93,669
Total	0	3	13	79	1,492	832	146	33	4	2,602
\$	0	39,475	79,025	88,039	101,448	99,573	102,837	98,167	138,470	100,351

Tier 2 Police and Fire Active Members

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
<20	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
30-34	0	1	17	2	0	0	0	0	0	20
\$	0	57,776	83,349	39,152	0	0	0	0	0	77,651
35-39	1	12	263	159	0	0	0	0	0	435
\$	40,881	65,616	93,932	97,260	0	0	0	0	0	94,245
40-44	0	10	391	966	30	0	0	0	0	1,397
\$	0	69,073	89,817	95,327	99,888	0	0	0	0	93,695
45-49	0	6	235	924	92	0	0	0	0	1,257
\$	0	62,969	91,050	92,161	96,667	0	0	0	0	92,144
50-54	0	0	133	520	42	0	0	0	0	695
\$	0	0	81,816	87,721	96,352	0	0	0	0	87,113
55-59	0	0	90	282	18	0	0	0	0	390
\$	0	0	76,100	79,656	86,326	0	0	0	0	79,143
60-64	0	3	41	179	10	0	0	0	0	233
\$	0	58,093	72,772	74,121	76,447	0	0	0	0	73,777
65-69	0	0	17	41	1	0	0	0	0	59
\$	0	0	77,502	76,486	64,215	0	0	0	0	76,571
70-74	0	0	3	4	0	0	0	0	0	7
\$	0	0	130,398	99,287	0	0	0	0	0	112,621
75+	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
Total	1	32	1,190	3,077	193	0	0	0	0	4,493
\$	40,881	65,250	88,285	90,239	94,919	0	0	0	0	89,733

All Tier 1/Tier 2 Active Members

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
<20	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
30-34	3	14	130	14	0	0	0	0	0	161
\$	24,516	61,856	56,319	60,325	0	0	0	0	0	56,556
35-39	8	134	1,866	858	16	0	0	0	0	2,882
\$	23,499	51,663	69,931	70,882	68,273	0	0	0	0	69,227
40-44	23	224	2,738	4,638	548	12	0	0	0	8,183
\$	45,180	45,989	70,356	77,424	80,638	74,116	0	0	0	74,318
45-49	30	234	2,317	5,446	3,145	545	10	0	0	11,727
\$	69,760	50,023	68,953	75,134	83,609	81,554	59,222	0	0	75,956
50-54	16	147	2,029	4,719	3,295	2,481	377	6	0	13,070
\$	63,443	52,643	62,209	68,520	79,300	82,978	79,029	66,139	0	73,120
55-59	10	135	1,937	4,763	3,334	2,749	1,229	211	1	14,369
\$	79,828	52,409	57,423	61,404	69,178	76,820	81,474	74,299	80,914	67,456
60-64	9	102	1,416	3,547	2,552	1,985	800	355	44	10,810
\$	47,514	49,101	57,954	60,128	64,842	74,679	81,674	79,579	69,737	65,786
65-69	13	40	478	1,038	719	582	251	113	35	3,269
\$	43,814	49,225	59,033	61,822	67,042	72,272	88,613	94,651	87,829	67,667
70-74	2	14	102	214	118	81	38	29	17	615
\$	29,205	35,316	53,483	59,989	62,143	77,764	76,521	81,860	112,460	64,506
75+	3	3	29	39	16	17	9	7	12	135
\$	9,273	44,832	42,466	46,550	53,131	66,740	74,165	85,105	98,393	56,577
Total	117	1,047	13,042	25,276	13,743	8,452	2,714	721	109	65,221
\$	53,763	49,872	64,762	68,755	74,367	78,102	81,678	80,430	85,467	70,715

Age/Service and Prior Year Covered Payroll by Rate Pool

Tier 1/Tier 2 SLGRP Active Members

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
<20	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
30-34	1	7	86	10	0	0	0	0	0	104
\$	43,560	68,338	61,108	64,469	0	0	0	0	0	61,749
35-39	3	62	761	527	10	0	0	0	0	1,363
\$	38,186	56,605	71,253	69,721	72,102	0	0	0	0	69,928
40-44	2	81	1,202	2,241	369	7	0	0	0	3,902
\$	43,683	51,499	73,087	79,286	82,717	74,782	0	0	0	77,098
45-49	4	86	1,118	2,871	1,623	383	6	0	0	6,091
\$	28,920	60,028	76,386	78,062	86,578	82,802	57,720	0	0	80,015
50-54	5	70	945	2,491	1,732	1,270	255	4	0	6,772
\$	21,917	56,283	72,645	76,187	84,489	86,556	80,684	72,285	0	79,682
55-59	5	67	923	2,297	1,643	1,501	643	144	0	7,223
\$	23,420	59,397	67,128	72,466	79,668	83,114	83,032	74,312	0	76,457
60-64	5	48	755	1,858	1,244	1,213	523	193	35	5,874
\$	26,515	53,134	67,665	70,383	77,312	83,357	88,539	82,693	73,130	76,039
65-69	6	18	277	576	413	360	181	83	22	1,936
\$	35,546	48,468	65,919	71,342	79,089	81,826	100,305	105,387	88,212	78,204
70-74	0	8	63	138	77	59	25	18	13	401
\$	0	46,678	65,450	66,204	67,931	87,776	96,231	97,217	118,758	74,170
75+	3	3	21	26	11	15	6	7	11	103
\$	9,273	44,832	47,563	49,892	66,099	72,178	96,154	85,105	105,794	64,121
Total	34	450	6,151	13,035	7,122	4,808	1,639	449	81	33,769
\$	28,280	55,937	71,177	75,007	81,970	83,974	86,488	84,727	88,985	77,473

Tier 1/Tier 2 School District Active Members

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
<20	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
30-34	2	4	34	1	0	0	0	0	0	41
\$	14,994	57,653	42,264	26,202	0	0	0	0	0	42,044
35-39	5	64	937	226	5	0	0	0	0	1,237
\$	14,686	43,621	65,897	65,549	50,893	0	0	0	0	64,413
40-44	14	132	1,300	1,955	107	2	0	0	0	3,510
\$	14,385	40,231	65,576	72,385	65,187	60,988	0	0	0	68,197
45-49	12	126	1,030	2,099	1,193	108	2	0	0	4,570
\$	12,571	36,574	58,973	68,651	75,037	72,435	50,286	0	0	67,186
50-54	4	59	934	1,842	1,278	998	86	2	0	5,203
\$	9,624	33,686	49,572	55,166	68,916	75,908	67,636	53,848	0	61,445
55-59	0	47	880	2,165	1,474	1,052	516	51	1	6,186
\$	0	27,191	44,831	47,957	55,507	66,076	76,957	67,193	80,914	54,818
60-64	2	39	554	1,433	1,119	634	226	141	8	4,156
\$	18,058	26,744	41,711	45,203	48,422	56,199	66,411	73,229	57,884	49,224
65-69	4	14	168	382	252	175	58	23	8	1,084
\$	9,077	22,493	44,262	43,273	45,187	52,353	53,580	55,028	84,440	46,047
70-74	2	3	32	57	33	17	12	9	2	167
\$	29,205	18,107	27,039	43,902	42,142	42,290	38,146	49,376	63,052	39,630
75+	0	0	7	10	3	2	3	0	1	26
\$	0	0	26,245	33,619	12,667	25,955	30,187	0	16,984	27,591
Total	45	488	5,876	10,170	5,464	2,988	903	226	20	26,180
\$	13,889	36,104	55,568	58,017	61,062	66,524	71,198	68,893	68,130	59,146

Tier 1/Tier 2 Independent Employers Active Members

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
<20	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0	0
\$	0	0	0	0	0	0	0	0	0	0
30-34	0	3	10	3	0	0	0	0	0	16
\$	0	52,335	62,924	57,885	0	0	0	0	0	59,994
35-39	0	8	168	105	1	0	0	0	0	282
\$	0	77,713	86,442	88,190	116,888	0	0	0	0	86,953
40-44	7	11	236	442	72	3	0	0	0	771
\$	107,196	74,519	82,773	90,277	92,944	81,316	0	0	0	88,123
45-49	14	22	169	476	329	54	2	0	0	1,066
\$	130,447	87,943	80,604	86,062	100,043	90,939	72,665	0	0	90,355
50-54	7	18	150	386	285	213	36	0	0	1,095
\$	123,858	100,624	75,149	82,763	94,327	94,778	94,521	0	0	88,010
55-59	5	21	134	301	217	196	70	16	0	960
\$	136,236	86,557	73,261	73,711	82,622	86,284	100,455	96,840	0	81,172
60-64	2	15	107	256	189	138	51	21	1	780
\$	129,469	94,324	73,532	69,242	79,987	83,292	78,903	93,595	45,781	76,814
65-69	3	8	33	80	54	47	12	7	5	249
\$	106,664	97,708	76,431	81,851	76,888	73,257	81,582	97,548	91,564	79,866
70-74	0	3	7	19	8	5	1	2	2	47
\$	0	22,229	66,663	63,111	88,938	80,238	44,268	89,831	120,929	70,445
75+	0	0	1	3	2	0	0	0	0	6
\$	0	0	48,983	60,679	42,505	0	0	0	0	52,672
Total	38	109	1,015	2,071	1,157	656	172	46	8	5,272
\$	123,783	86,471	79,116	82,130	90,407	87,793	90,856	95,162	93,183	84,876

OPSRP Active General Service Members

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
<20	101	0	0	0	0	0	0	0	0	101
\$	10,758	0	0	0	0	0	0	0	0	10,758
20-24	2,171	32	0	0	0	0	0	0	0	2,203
\$	22,834	21,039	0	0	0	0	0	0	0	22,808
25-29	8,004	1,096	33	0	0	0	0	0	0	9,133
\$	34,786	40,856	43,453	0	0	0	0	0	0	35,545
30-34	8,544	5,271	1,187	0	0	0	0	0	0	15,002
\$	40,350	49,282	52,658	0	0	0	0	0	0	44,462
35-39	7,660	5,661	3,813	0	0	0	0	0	0	17,134
\$	42,321	53,413	59,241	0	0	0	0	0	0	49,751
40-44	6,044	4,715	3,058	0	0	0	0	0	0	13,817
\$	42,226	54,757	60,068	0	0	0	0	0	0	50,451
45-49	5,227	4,453	3,065	0	0	0	0	0	0	12,745
\$	41,701	51,355	57,281	0	0	0	0	0	0	48,821
50-54	3,897	3,501	2,945	0	0	0	0	0	0	10,343
\$	40,535	48,279	51,295	0	0	0	0	0	0	46,220
55-59	3,078	3,053	2,749	0	0	0	0	0	0	8,880
\$	40,181	48,970	49,202	0	0	0	0	0	0	45,995
60-64	2,140	2,249	1,984	0	0	0	0	0	0	6,373
\$	38,356	46,080	49,183	0	0	0	0	0	0	44,452
65-69	730	898	746	0	0	0	0	0	0	2,374
\$	31,314	45,342	49,089	0	0	0	0	0	0	42,206
70-74	211	203	151	0	0	0	0	0	0	565
\$	24,080	33,536	41,178	0	0	0	0	0	0	32,047
75+	53	56	60	0	0	0	0	0	0	169
\$	20,946	27,338	28,698	0	0	0	0	0	0	25,816
Total	47,860	31,188	19,791	0	0	0	0	0	0	98,839
\$	38,946	50,201	54,446	0	0	0	0	0	0	45,601

OPSRP Active Police and Fire Members

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
<20	1	0	0	0	0	0	0	0	0	1
\$	68,773	0	0	0	0	0	0	0	0	68,773
20-24	225	2	0	0	0	0	0	0	0	227
\$	48,595	46,716	0	0	0	0	0	0	0	48,578
25-29	1,044	187	4	0	0	0	0	0	0	1,235
\$	55,350	71,334	73,429	0	0	0	0	0	0	57,828
30-34	864	908	221	0	0	0	0	0	0	1,993
\$	57,043	75,637	79,488	0	0	0	0	0	0	68,003
35-39	495	797	590	0	0	0	0	0	0	1,882
\$	56,561	76,020	80,486	0	0	0	0	0	0	72,302
40-44	307	468	396	0	0	0	0	0	0	1,171
\$	57,305	73,913	79,935	0	0	0	0	0	0	71,595
45-49	199	352	250	0	0	0	0	0	0	801
\$	56,453	69,098	76,128	0	0	0	0	0	0	68,151
50-54	142	186	152	0	0	0	0	0	0	480
\$	57,105	63,629	71,906	0	0	0	0	0	0	64,320
55-59	87	140	115	0	0	0	0	0	0	342
\$	55,555	66,303	66,423	0	0	0	0	0	0	63,609
60-64	41	87	63	0	0	0	0	0	0	191
\$	63,495	67,080	67,338	0	0	0	0	0	0	66,395
65-69	15	33	32	0	0	0	0	0	0	80
\$	53,455	58,555	57,030	0	0	0	0	0	0	56,989
70-74	3	4	7	0	0	0	0	0	0	14
\$	96,442	134,862	51,467	0	0	0	0	0	0	84,932
75+	2	3	1	0	0	0	0	0	0	6
\$	57,363	65,826	38,754	0	0	0	0	0	0	58,493
Total	3,425	3,167	1,831	0	0	0	0	0	0	8,423
\$	55,956	73,014	77,044	0	0	0	0	0	0	66,954

All OPSRP Active Members

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
<20	102	0	0	0	0	0	0	0	0	102
\$	11,327	0	0	0	0	0	0	0	0	11,327
20-24	2,396	34	0	0	0	0	0	0	0	2,430
\$	25,253	22,549	0	0	0	0	0	0	0	25,215
25-29	9,048	1,283	37	0	0	0	0	0	0	10,368
\$	37,158	45,298	46,694	0	0	0	0	0	0	38,200
30-34	9,408	6,179	1,408	0	0	0	0	0	0	16,995
\$	41,883	53,155	56,869	0	0	0	0	0	0	47,223
35-39	8,155	6,458	4,403	0	0	0	0	0	0	19,016
\$	43,186	56,203	62,087	0	0	0	0	0	0	51,983
40-44	6,351	5,183	3,454	0	0	0	0	0	0	14,988
\$	42,955	56,487	62,345	0	0	0	0	0	0	52,103
45-49	5,426	4,805	3,315	0	0	0	0	0	0	13,546
\$	42,242	52,655	58,702	0	0	0	0	0	0	49,964
50-54	4,039	3,687	3,097	0	0	0	0	0	0	10,823
\$	41,118	49,053	52,306	0	0	0	0	0	0	47,023
55-59	3,165	3,193	2,864	0	0	0	0	0	0	9,222
\$	40,603	49,730	49,893	0	0	0	0	0	0	46,648
60-64	2,181	2,336	2,047	0	0	0	0	0	0	6,564
\$	38,829	46,862	49,742	0	0	0	0	0	0	45,091
65-69	745	931	778	0	0	0	0	0	0	2,454
\$	31,759	45,811	49,415	0	0	0	0	0	0	42,688
70-74	214	207	158	0	0	0	0	0	0	579
\$	25,095	35,494	41,634	0	0	0	0	0	0	33,326
75+	55	59	61	0	0	0	0	0	0	175
\$	22,270	29,295	28,863	0	0	0	0	0	0	26,937
Total	51,285	34,355	21,622	0	0	0	0	0	0	107,262
\$	40,082	52,304	56,359	0	0	0	0	0	0	47,278

Inactive Member Data Exhibits

For the following exhibits, inactive members are counted by lives, not by segments.

Total Tier 1/Tier 2

Inactive Members		
	Count	Average Deferred Monthly Benefit
<20	0	\$0
20-24	0	0
25-29	2	85
30-34	127	354
35-39	1,129	626
40-44	2,828	996
45-49	4,027	1,278
50-54	4,934	1,492
55-59	6,478	1,455
60-64	5,496	1,630
65-69	3,148	1,517
70-74	1,303	1,207
75+	1,027	1,363
Total	30,499	\$1,384

Retirees and Beneficiaries		
	Count	Average Deferred Monthly Benefit
<45	556	\$1,177
45-49	360	1,661
50-54	1,140	2,846
55-59	5,534	2,939
60-64	20,112	2,946
65-69	33,572	2,820
70-74	29,391	2,716
75-79	19,057	2,439
80-84	12,424	2,126
85-89	7,985	1,777
90-94	4,313	1,312
95-99	1,197	998
100+	178	716
Total	135,819	\$2,566

OPSRP

Inactive Members		
	Count	Average Deferred Monthly Benefit
<20	0	\$0
20-24	11	113
25-29	304	196
30-34	1,720	324
35-39	2,663	404
40-44	2,044	443
45-49	1,889	417
50-54	1,745	401
55-59	1,488	372
60-64	1,189	393
65-69	862	324
70-74	554	199
75+	353	75
Total	14,822	\$373

Retirees and Beneficiaries		
	Count	Average Monthly Benefit
<45	8	\$1,290
45-49	8	877
50-54	11	984
55-59	185	267
60-64	624	347
65-69	1,363	464
70-74	667	453
75-79	87	381
80-84	11	426
85-89	0	0
90-94	0	0
95-99	0	0
100+	0	0
Total	2,964	\$427

System-Wide Totals

Inactive Members			Retirees and Beneficiaries		
	Count	Average Deferred Monthly Benefit		Count	Average Monthly Benefit
<20	0	\$0	<45	564	\$1,178
20-24	11	113	45-49	368	1,644
25-29	306	196	50-54	1,151	2,828
30-34	1,847	326	55-59	5,719	2,852
35-39	3,792	470	60-64	20,736	2,868
40-44	4,872	764	65-69	34,935	2,728
45-49	5,916	1,003	70-74	30,058	2,665
50-54	6,679	1,207	75-79	19,144	2,429
55-59	7,966	1,253	80-84	12,435	2,125
60-64	6,685	1,410	85-89	7,985	1,777
65-69	4,010	1,261	90-94	4,313	1,312
70-74	1,857	906	95-99	1,197	998
75+	1,380	1,033	100+	178	716
Total	45,321	\$1,053	Total	138,783	\$2,521

Retiree Healthcare Member Data Exhibits

For the following exhibits, inactive members are counted by lives, not by pool or employer segments.

RHIA Members

	As of December 31, 2016	As of December 31, 2015
Dormant members		
Number	14,705	14,360
Average Age	54.6	53.8
Retired members under age 65 eligible for deferred RHIA benefits		
Number	24,859	26,918
Average Age	60.3	60.3
Retired members receiving RHIA benefits		
Number	47,115	46,574
Average Age	75.8	75.6

RHIPA Members

	As of December 31, 2016	As of December 31, 2015
Active Tier 1/Tier 2 employees of RHIPA employers		
Number	17,713	19,198
Average Age	53.7	53.2
Average Service	20.3	19.6
Retired members receiving RHIPA benefits		
Number	1,167	1,303
Average Age	61.7	61.7
Average Monthly Subsidy Amount	318	299

Actuarial Methods and Assumptions

Tier 1/Tier 2 (including Retiree Healthcare)

Actuarial Methods and Valuation Procedures

In July 2017 the Board adopted the following actuarial methods and valuation procedures for the December 31, 2016 and 2017 actuarial valuations of PERS Tier 1/Tier 2 benefits.

Actuarial cost method

Entry Age Normal. Under the Entry Age Normal (EAN) cost method, each active member's **entry age present value of projected benefits** is allocated over the member's service from the member's date of entry until their assumed date of exit, taking into consideration expected future compensation increases. Thus, the total pension to which each member is expected to become entitled at retirement is broken down into units, each associated with a year of past or projected future credited service. Typically, when this method is introduced, there will be an initial liability for benefits credited for service prior to that date, and to the extent that the liability is not covered by assets of the plan, there is an unfunded accrued liability to be funded over a stipulated period in accordance with an amortization schedule.

A detailed description of the calculation follows:

- An individual member's **entry age present value of projected benefits** is the sum of the present value of the benefit described under the plan at each possible separation date, determined at the member's entry age using the projected compensation and service at each separation date.
- An individual member's **entry age present value of projected salaries** is the sum of the present value of the projected compensation over the member's working career associated with each possible future separation date, determined at the member's entry age.
- An individual member's **present value of projected benefits** is the sum of the present value of the benefit described under the plan at each possible separation date, determined at the valuation date using the projected compensation and service at each separation date.
- An individual member's **normal cost** for a certain year is the member's **entry age present value of projected benefits** divided by the member's **entry age present value of projected salaries** and multiplied by the member's projected compensation for the year following the valuation date.
- An individual member's **actuarial accrued liability** is the member's **present value of projected benefits** less the sum of the present value of the member's **normal costs** for each future year, determined at the valuation date using the projected compensation and service at each future year.
 - The plan's **normal cost** is the sum of the individual member normal costs, and the plan's **actuarial accrued liability** is the sum of the individual member accrued liabilities.

*Tier 1/Tier 2 UAL
amortization*

The Tier 1/Tier 2 UAL amortization period was reset to 20 years as of December 31, 2013. Gains and losses between subsequent odd-year valuations will be amortized as a level percentage of projected combined valuation payroll (Tier 1/ Tier 2 plus OPSRP payroll) over a closed 20 year period from the valuation in which they are first recognized.

<i>Retiree Healthcare UAL amortization</i>	The UAL for Retiree Health Care as of December 31, 2007 is amortized as a level percentage of projected combined valuation payroll (Tier 1/ Tier 2 plus OPSRP payroll) over a closed 10 year period. Gains and losses between subsequent odd-year valuations are amortized as a level percentage of combined valuation payroll over a closed 10 year period from the valuation in which they are first recognized.
<i>Asset valuation method</i>	The actuarial value of assets equals the market value of assets, excluding the Contingency and Capital Preservation Reserves, and the Rate Guarantee Reserve when it is in positive surplus status. Market values are reported to Milliman by PERS. It is our understanding that select real estate and private equity investments are reported on a three-month lag basis. This valuation report does not attempt to quantify any effects of the reporting lag.
<i>Contribution rate stabilization method</i>	Contribution rates for a rate pool (e.g. Tier 1/Tier 2 SLGRP, Tier 1/Tier 2 School Districts, OPSRP) are confined to a collared range based on the prior contribution rate (prior to application of side accounts, pre-SLGRP liabilities, and 6 percent Independent Employer minimum). The new contribution rate will generally not increase or decrease from the prior contribution rate by more than the greater of 3 percent of payroll or 20 percent of the prior contribution rate. If the funded percentage excluding side accounts drops below 60% or increases above 140%, the size of the collar doubles. If the funded percentage excluding side accounts is between 60% and 70% or between 130% and 140%, the size of the rate collar is increased on a graded scale.
<i>Allocation of Liability for Service Segments</i>	For active Tier 1/Tier 2 members who have worked for multiple PERS employers over their career, the calculated actuarial accrued liability is allocated among the employers based on a weighted average of the Money Match methodology, which uses account balance, and the Full Formula methodology, which uses service. The allocation is 15% (0% for police & fire) based on account balance with each employer and 85% (100% for police & fire) based on service with each employer. The entire normal cost is allocated to the current employer.
<i>Allocation of Benefits-In-Force (BIF) Reserve</i>	The BIF reserve is allocated to each rate pool in proportion to the retiree liability attributable to the rate pool.

Economic Assumptions

The Board adopted the following economic assumptions for the December 31, 2016 and 2017 actuarial valuations. All assumptions were reviewed and adopted in conjunction with the 2016 Experience Study, published in July 2017. The assumption selection process and rationale is described in detail in that report.

<i>Investment return</i>	7.20% compounded annually
<i>Pre-2014 Interest crediting</i>	8.00% compounded annually on members' regular account balances 8.25% compounded annually on members' variable account balances
<i>Post-2013 Interest crediting</i>	7.20% compounded annually on members' regular account balances 7.20% compounded annually on members' variable account balances
<i>Inflation</i>	2.50% compounded annually
<i>Administrative expenses</i>	\$37.5 million per year is added to the normal cost.
<i>Payroll growth</i>	3.50% compounded annually. This assumption represents the sum of the inflation assumption and a real wage growth assumption of 100 basis points.
<i>Healthcare cost trend</i>	Healthcare cost trend rates are used to estimate increases in the RHIPA Maximum Subsidy. These rates include consideration of the excise tax scheduled to be introduced in 2020 by the Affordable Care Act.

Year ²	Rate	Year	Rate
2017	7.5%	2049 – 2052	5.4%
2018	6.5	2053 – 2058	5.3
2019	5.9	2059 – 2063	5.2
2020	5.4	2064	5.1
2021 – 2023	5.3	2065	5.0
2024 – 2025	5.2	2066	4.9
2026 – 2027	5.3	2067 – 2068	4.8
2028	5.4	2069	4.7
2029 – 2032	6.2	2070	4.6
2033 – 2039	6.1	2071	4.5
2040	6.0	2072 – 2073	4.4
2041	5.8	2074 – 2090	4.3
2042 – 2043	5.7	2091	4.2
2044 – 2045	5.6	2092	4.3
2046 – 2048	5.5	2093+	4.2

² For valuation purposes, the health cost trend rates are assumed to be applied at the beginning of the plan year.

Demographic Assumptions

The Board adopted the following demographic assumptions for the December 31, 2016 and 2017 actuarial valuations. All assumptions were reviewed and adopted in conjunction with the 2016 Experience Study, published in July 2017. The study relied on data from an observation period of January 1, 2013 to December 31, 2016, with the exception of the merit scale assumption, which relied on data from 2008 through 2016. Assumptions selected from the study represent an estimate of future experience based on relevant recent experience and reasonable expectations about the future.

Mortality

Healthy Retired Members

The following healthy retired mortality tables were first adopted in the December 31 valuation of the years shown.

Basic Table	RP 2014 Healthy Annuitant, Sex Distinct, Generational Projection with Unisex Social Security Data Scale	Valuation Year Adopted
School District male	White collar, set back 12 months	2016
Other General Service male*	Blended 50% blue collar / 50% white collar, set back 12 months	2016
Police & Fire male	Blended 50% blue collar / 50% white collar, set back 12 months	2016
School District female	White collar, set back 12 months	2016
Other female**	Blended 50% blue collar / 50% white collar, no set back	2016

* including male beneficiaries of members of all classes

** including female beneficiaries of members of all classes

Disabled Retired Members

The following disabled retiree mortality rates were first adopted for the December 31, 2016 actuarial valuation.

Basic Table	RP 2014 Disabled Retiree, Sex Distinct, Generational Projection with Unisex Social Security Data Scale
Male	No collar adjustment or set back
Female	No collar adjustment or set back

Non-Annuitant Members

Mortality for non-annuitant members is assumed to follow the RP-2014 Employee table, sex distinct, with generational projection using a unisex Social Security data scale, and the same collar and set back adjustments for each group as described above for Healthy Retired members.

This assumption was first adopted for the December 31, 2016 actuarial valuation.

Retirement Assumptions

The retirement assumptions used in the actuarial valuation include the following:

- Retirement from active status/dormant status
- Probability a member will elect a lump sum option at retirement
- Percentage of members who elect to purchase credited service at retirement.

Rates of Retirement from Active Status

The following retirement rate assumptions were first adopted in the December 31, 2016 valuation.

Age	Police & Fire			General Service			School Districts			Judges
	< 13 yrs	13-24 yrs	25+ yrs	<15 yrs	15-29 yrs	30+ yrs	<15 yrs	15-29 yrs	30+ yrs	
Less than 50						15.00%			25.00%	
50	1.50%	2.00%	24.00%			15.00%			25.00%	
51	1.50%	2.00%	17.50%			15.00%			25.00%	
52	1.50%	2.00%	17.50%			15.00%			25.00%	
53	1.50%	2.00%	17.50%			15.00%			25.00%	
54	1.50%	3.50%	17.50%			15.00%			25.00%	
55	3.00%	10.00%	23.50%	1.50%	3.00%	15.00%	1.50%	4.00%	25.00%	
56	3.00%	8.00%	23.50%	1.50%	3.00%	15.00%	1.50%	4.00%	25.00%	
57	3.00%	8.00%	23.50%	1.50%	3.00%	15.00%	1.50%	4.00%	25.00%	
58	6.00%	8.00%	23.50%	1.50%	10.00%	20.00%	1.50%	12.50%	28.50%	
59	6.00%	8.00%	23.50%	3.50%	10.00%	20.00%	4.50%	12.50%	28.50%	
60	6.00%	11.00%	23.50%	6.00%	10.00%	20.00%	6.50%	12.50%	28.50%	6.00%
61	6.00%	14.00%	23.50%	6.00%	10.00%	20.00%	6.50%	12.50%	28.50%	6.00%
62	15.00%	25.00%	38.00%	13.00%	19.50%	31.00%	15.00%	25.00%	34.00%	6.00%
63	15.00%	17.00%	38.00%	11.50%	16.50%	22.00%	13.00%	19.50%	26.50%	6.00%
64	15.00%	17.00%	17.00%	12.50%	16.50%	22.00%	13.00%	19.50%	31.50%	6.00%
65	100.00%	100.00%	100.00%	19.50%	28.00%	32.00%	25.50%	33.50%	42.00%	6.00%
66				27.50%	35.00%	38.00%	23.00%	36.50%	42.00%	6.00%
67				22.50%	25.00%	26.00%	21.00%	34.50%	42.00%	10.00%
68				19.50%	25.00%	26.00%	21.00%	28.00%	28.50%	10.00%
69				19.50%	25.00%	26.00%	21.00%	28.00%	28.50%	10.00%
70				100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Retirement from Dormant Status

Dormant members are assumed to retire at Normal Retirement Age (age 58 for Tier 1, age 60 for Tier 2, age 60 for Judges, and age 55 for Police & Fire) or at the first unreduced retirement age (30 years of service, or age 50 with 25 years of service for Police & Fire).

Lump Sum Option at Retirement

Members retiring may elect to receive a full or partial lump sum at retirement. The probability that a retiring member will elect a lump sum at retirement is summarized in the table below. These rates were first adopted effective December 31, 2016.

Lump Sum Option at Retirement	
Partial Lump Sum:	3.5% for all years
Total Lump Sum:	2.0% for 2017, declining by 0.5% per year until reaching 0.0%
No Lump Sum:	94.5% in 2017, increasing by 0.5% per year until reaching 96.5%

Purchase of Credited Service at Retirement

The following percentages of members are assumed to purchase credit for the six-month waiting period at retirement. These rates were first adopted effective December 31, 2016.

Purchase of Credited Service at Retirement	
Money Match Retirements:	0%
Non-Money Match Retirements:	65%

Judge Member Plan Election

All judge members are assumed to elect to retire under the provisions of Plan B.

Disability Assumptions

There are two disability assumptions used in the valuation - duty disability and ordinary disability. Duty disability rates are separated between Police & Fire and General Service, while ordinary disability is the same for all members. The rates for duty disability for General Service were first adopted effective December 31, 2014. The rates for duty disability for Police & Fire were first adopted effective December 31, 2012. The rates for ordinary disability were first adopted effective December 31, 2016.

Percentage of the 1985 Disability Class 1 Rates	
Duty Disability Police & Fire	20%
Duty Disability General Service	0.9%
Ordinary Disability	35% with 0.18% cap

Termination Assumptions

The termination assumptions were first adopted effective December 31, 2016, except for the Police & Fire and General Service females which were adopted effective December 31, 2014.

Termination Rates

Sample termination rates are shown for each group below:

Duration from Hire Date	School District Male	School District Female	General Service Male	General Service Female	Police & Fire
0	16.63%	13.50%	17.00%	18.50%	10.00%
1	14.25%	12.50%	15.33%	17.00%	5.97%
5	6.86%	7.13%	7.74%	9.29%	3.31%
10	3.31%	3.85%	4.15%	5.24%	2.23%
15	2.30%	2.68%	2.86%	3.66%	1.50%
20	1.62%	1.95%	2.07%	2.63%	1.01%
25	1.20%	1.50%	1.49%	1.89%	0.80%
30+	1.20%	1.50%	1.40%	1.50%	0.80%

For a complete table of rates, please refer to the 2016 Experience Study report for the System, published in July 2017.

Oregon Residency Post-Retirement

For purposes of determining eligibility for SB 656/HB 3349 benefit adjustments, 85% of retirees are assumed to remain Oregon residents after retirement.

Salary Increase Assumptions

The salary increase assumptions reflected in the actuarial valuation include:

- Merit scale increases in addition to the payroll growth increase
- Unused Sick Leave adjustments
- Vacation Pay adjustments

Merit Increases

Merit increases are based on duration of service for the following groups with sample rates shown in the following table. These rates were first adopted effective December 31, 2016, except for the school district assumption, which was adopted December 31, 2014.

Duration	School District	Other General Service	Police & Fire
0	3.53%	3.38%	4.44%
1	3.20%	3.05%	3.95%
5	2.01%	1.94%	2.39%
10	0.82%	0.99%	1.23%
15	-0.07%	0.43%	0.69%
20	-0.67%	0.14%	0.52%
25	-0.91%	0.02%	0.44%
30+	-0.94%	-0.04%	0.21%

The assumed merit increase for active judge members is 0.0%.

For a complete table of rates, please refer to the 2016 Experience Study for the System, published in July 2017.

Unused Sick Leave

Members covered by the provision allowing unused sick leave to be used to increase final average salary are assumed to receive increases in their final average salary in accordance with the table below. This adjustment is not applied to disability benefits. Effective dates for the current assumption are shown in the table.

Unused Sick Leave	Valuation year adopted
Actives	
• State General Service Male	6.25% 2010
• State General Service Female	3.75% 2010
• School District Male	7.50% 2016
• School District Female	5.75% 2012
• Local General Service Male	4.75% 2012
• Local General Service Female	3.25% 2014
• State Police & Fire	4.75% 2012
• Local Police & Fire	7.25% 2016
Dormant Members	3.25% 2016

Vacation Pay

Members eligible to receive a lump sum payment of unused vacation pay are assumed to receive increases in their final average salary in accordance with the table below. This adjustment is not applied to disability benefits. These rates were adopted December 31, 2016, except the school district rates which were adopted effective December 31, 2012.

Vacation Pay	
Tier 1	
• State General Service	2.00%
• School District	0.25%
• Local General Service	2.75%
• State Police & Fire	2.50%
• Local Police & Fire	3.75%
Tier 2	
	0.00%

Retiree Healthcare Participation

The following percentages of eligible retiring members are assumed to elect RHIPA and RHIA coverage:

Retiree Healthcare Participation	
RHIPA	
• 8 – 9 years of service	10.0%
• 10 – 14 years of service	10.0%
• 15 – 19 years of service	18.0%
• 20 – 24 years of service	23.0%
• 25 – 29 years of service	29.0%
• 30+ years of service	38.0%
RHIA	
• Healthy Retired	35.0%
• Disabled Retired	20.0%

The RHIA disabled retired rate was first adopted December 31, 2008. The RHIA healthy retired rate and RHIPA rates for 20 to 24 years of service were adopted December 31, 2016. RHIPA Rates up through 14 years of service were first adopted effective December 31, 2012. All other RHIPA rates were first adopted effective December 31, 2014.

OPSRP

Most of the methods and assumptions adopted for the OPSRP valuation are the same as those used for Tier 1/ Tier 2. The methods and assumptions that differ for OPSRP are summarized below. The Board adopted the following methods, procedures and assumptions for the December 31, 2016 and December 31, 2017 actuarial valuations.

Actuarial Methods and Valuation Procedures

OPSRP UAL amortization

The UAL as of December 31, 2007 is amortized as a level percentage of projected combined valuation payroll (Tier 1/ Tier 2 plus OPSRP payroll) over a closed period 16 year period. Gains and losses between subsequent odd-year valuations are amortized as a level percentage of combined valuation payroll over 16 years from the valuation in which they are first recognized.

Economic Assumptions

Administrative expenses

\$6.5 million per year is added to the normal cost.

Demographic Assumptions

Retirement Assumptions

Rates of Retirement from Active Status

Age	Police & Fire			General Service			School Districts		
	< 13 yrs	13-24 yrs	25+ yrs	<15 yrs	15-29 yrs	30+ yrs	<15 yrs	15-29 yrs	30+ yrs
50	0.50%	1.50%	5.50%						
51	0.50%	1.50%	5.50%						
52	0.50%	1.50%	5.50%						
53	0.50%	1.50%	25.00%						
54	0.50%	1.50%	17.50%						
55	2.00%	5.00%	23.50%	1.00%	2.50%	5.00%	1.00%	2.50%	5.00%
56	2.00%	5.00%	23.50%	1.00%	2.50%	5.00%	1.00%	2.50%	5.00%
57	2.00%	5.00%	23.50%	1.00%	2.50%	7.50%	1.00%	2.50%	7.50%
58	4.00%	5.00%	23.50%	1.50%	3.00%	30.00%	1.50%	3.00%	30.00%
59	4.00%	5.00%	23.50%	2.00%	3.00%	25.00%	1.50%	3.00%	25.00%
60	4.00%	15.00%	23.50%	3.00%	3.75%	20.00%	2.50%	3.75%	20.00%
61	4.00%	8.50%	23.50%	3.00%	5.00%	20.00%	3.00%	5.00%	20.00%
62	10.00%	25.00%	38.00%	8.00%	12.00%	30.00%	6.00%	12.00%	30.00%
63	7.00%	17.00%	38.00%	7.00%	10.00%	20.00%	6.00%	10.00%	20.00%
64	7.00%	17.00%	17.00%	7.00%	10.00%	20.00%	6.00%	10.00%	20.00%
65	100.00%	100.00%	100.00%	13.00%	35.00%	20.00%	11.50%	35.00%	20.00%
66				15.50%	33.00%	20.00%	12.50%	33.00%	20.00%
67				15.50%	22.00%	30.00%	11.00%	22.00%	30.00%
68				13.00%	17.00%	20.00%	9.00%	17.00%	20.00%
69				13.00%	17.00%	20.00%	9.00%	17.00%	20.00%
70				100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Rates of Retirement from Dormant Status

Dormant members are assumed to retire at their Normal Retirement Age.

Changes in Actuarial Methods and Assumptions — Tier 1/ Tier 2 and OPSRP

A summary of key changes implemented since the December 31, 2015 valuation are described briefly below. Additional detail and a comprehensive list of changes in methods and assumptions can be found in the 2016 Experience Study for the System, published in July 2017.

Changes in Actuarial Methods and Allocation Procedures

Allocation of Liability for Service Segments

For purposes of allocating Tier 1/Tier 2 members' actuarial accrued liability among multiple employers, the valuation uses a weighted average of the Money Match methodology and the Full Formula methodology used by PERS when the member retires. The weights are determined based on the prevalence of each formula among the current Tier 1/Tier 2 population. For the December 31, 2014 and December 31, 2015 valuations, the Money Match was weighted 25 percent for General Service members and 0 percent for Police & Fire members. For the December 31, 2016 and December 31, 2017 valuations, this weighting has been adjusted to 15 percent for General Service members and 0 percent for Police & Fire members, based on a projection of the proportion of liability attributable to Money Match benefits at those valuation dates.

Changes in Economic Assumptions

Investment Return and Interest Crediting

The assumed investment return and interest crediting to both regular and variable account balances was reduced to 7.20%. Previously, the assumed investment return and interest crediting was 7.50%.

Administrative Expenses

The administrative expense assumptions were updated to \$37.5 million per year for Tier 1/Tier 2 and \$6.5 million per year for OPSRP. Previously these were assumed to be \$33.0 million per year and \$5.5 million per year, respectively.

Healthcare Cost Inflation

The healthcare cost inflation assumption for the maximum RHIPA subsidy was updated based on analysis performed by Milliman's healthcare actuaries. This analysis includes the consideration of the excise tax that will be introduced in 2020 by the Affordable Care Act.

Changes in Demographic Assumptions

Healthy Mortality

The healthy mortality assumption was updated to reflect RP2014 generational mortality tables with group-specific class and setback adjustments, and to use a mortality projection scale based on 60 year unisex average Social Security experience. Previously the assumption was based on RP2000 generational mortality tables with group-specific class and setback adjustments and mortality projection Scale BB.

Disabled Mortality

The disabled mortality assumption was updated to RP2014 disabled tables with generational mortality projected using a mortality projection scale based on 60 year unisex average Social Security experience. Previously the assumption was based on RP2000 disabled tables with generational projection using Scale BB.

Non-Annuitant Mortality

Non-annuitant mortality assumption was updated to RP2014 employee tables with the same group-specific class and setback adjustments and mortality projection scale as used for the healthy retiree mortality assumption. Previously the assumption was based on applying a group-specific percentage adjustment to the healthy retiree mortality assumption.

Disability, Retirement from Active Status, and Termination

Rates for disability, retirement from active status, and termination were adjusted. The rates at which members are assumed to elect full or partial lump sums or purchase credited service at retirement were also adjusted.

Retiree Healthcare Participation

The RHIA participation rate for healthy retirees was reduced from 38% to 35%. The RHIPA participation rate was updated for members with 20 to 24 years of service.

Merit Increases, Unused Sick Leave, and Vacation Pay

Assumed merit increases were decreased slightly for non-school general service members and police and fire members. Unused Sick Leave and Vacation Pay rates were adjusted.

Summary of Plan Provisions

Summary of Plan Provisions

The following section summarizes the plan provisions considered in the actuarial valuation. A more detailed description of plan provisions is available from PERS.

<i>Membership</i>	All employees of public employers participating in this System who are in qualifying positions become members of the System after completing six months of service except those who are eligible for and have elected to participate in an optional retirement plan. Different benefit provisions of the plan apply based on date of hire.	
	Tier 1	Hired prior to 1996
	Tier 2	Hired after 1995 and before August 29, 2003
	OPSRP	Hired after August 28, 2003, and neither a judge nor a former Tier 1/Tier 2 member eligible to reestablish Tier 1/Tier 2 membership
	Judges	Members of the State Judiciary
<i>Member Contributions</i>	Judges	7% of salary
	All others	None
<i>Employer Contributions</i>	Set by the PERS Board based on actuarial calculations that follow Board rate-setting policies for employers.	

Summary of Chapter 238 Provisions — Tier 1/Tier 2 and Judges

<i>Normal Retirement Date</i>	Police and Fire	Age 55
	Judges	Age 65
	Tier 1 General Service	Age 58
	Tier 2 General Service	Age 60

Normal Retirement Allowance For Members who are not Judges, the greatest of the Full Formula benefit, the Money Match benefit, or the Formula Plus Annuity benefit (only available to Members who made contributions before August 21, 1981). For Members with 15 or more years of creditable service, the benefit will not be less than the minimum service retirement allowance of \$100 per month, as described in ORS 238.310.

Full Formula The percentage multiplier from the table below multiplied by final average salary and years of creditable service plus a prior service pension, if applicable.

Percentage Multiplier	Membership Classification
2.00%	Fire, Police and Legislators
1.67%	All other members

Money Match The Member’s account balance and a matching employer amount converted to an actuarially equivalent annuity.

Formula Plus Annuity The Member’s account balance converted to an actuarially equivalent cash refund annuity plus the percentage multiplier from the table below multiplied by final average salary and years of creditable service, plus a prior service pension, if applicable.

Percentage Multiplier	Membership Classification
1.35%	Fire, Police and Legislators
1.00%	All other members

Normal Retirement Allowance (continued)

Judges

Final average salary multiplied by the first percentage multiplier from the table below for up to 16 years of service plus the second percentage multiplier for any service in excess of 16 years, but not to exceed the maximum percentage of final average salary also shown below. Judges must elect Plan A or Plan B no later than age 60. A "Plan B" judge must serve as a pro tem judge for a total of 175 days postretirement.

Plan	Percentage Factor (up to 16 years)	Percentage Factor (after 16 years)	Maximum Percentage of Final Average Salary
A	2.8125%	1.67%	65%
B	3.75%	2.00%	75%

Final Average Salary

The greater of:

- Average salary earned during the three calendar years in which the member was paid the highest salary, even if one of those years is less than a full calendar year.
- Total salary earned over the last 36 months of employment divided by the actual months of service during that 36 month period.

Covered salary for this purpose includes the value of member contributions assumed and paid by employers, any payment due to an employer's participation in the Unused Sick Leave program, and, for Tier 1 members, lump sum payment of unused vacation time.

Creditable Service

The number of years and months an active Member is paid a salary by a participating PERS employer and PERS benefits are being funded.

Prior Service Pension

Benefits payable on account of Prior Service Credit for a member's service with a participating employer prior to the employer's participation in PERS, as described in ORS 238.442.

SB 656/HB 3349 Adjustment

All members receive an increase to their monthly retirement benefit equal to the greater of the increase under Senate Bill 656 (SB 656) or House Bill 3349 (HB 3349). The adjustment for SB 656 only applies to members who established membership prior to July 14, 1995. Senate Bill 822, enacted in 2013, limits eligibility for these adjustments to only PERS beneficiaries who pay Oregon state income tax.

SB 656 Increase

Years of Service	General Service	Police & Fire
0-9	0.0%	0.0%
10-14	1.0	1.0
15-19	1.0	1.0
20-24	2.0	2.5
25-29	3.0	4.0
30 & Over	4.0	4.0

HB 3349 Increase

$$\left(\frac{1}{1 - \text{maximum Oregon personal income tax rate (limited to 9\%)}} - 1 \right) \times \frac{\text{Service prior to October 1, 1991}}{\text{All Service}}$$

<i>Early Retirement Eligibility</i>	Police and Fire	Age 50 or 30 years of service
	Judges	Age 60
	General Service	Age 55 or 30 years of service
<i>Early Retirement Allowance</i>	Normal retirement allowance, actuarially reduced to early retirement age. However, there is no reduction applied if a member has completed 30 years of service (25 years for police & fire members) or for judges in Plan B.	
<i>Vesting</i>	Contributions made in any part of five calendar years or attainment of age 50 (45 for police & fire) while working in a qualifying position.	
<i>Termination Benefits</i>	Non-Vested	Payment of member's account balance.
	Vested	Same as normal (or early) retirement allowance, but commencement is deferred to normal (or early) retirement date.
<i>Optional Forms of Retirement Allowance</i>	The normal form of benefit is a cash refund annuity (joint and two-thirds survivor contingent annuity for a married judge). All optional amounts are adjusted to be actuarially equivalent.	
	Options Available <ul style="list-style-type: none"> • Life annuity • Cash refund annuity • Life annuity guaranteed 15 years • Joint and 50% or 100% survivor contingent annuity, with or without pop-up feature • Partial Lump Sum: Refund of member contribution account balance plus a pension (under any optional form) of employer-paid portion of the Full Formula or Money Match annuity. • Total Lump Sum: Refund of member contribution account plus a matching employer amount. 	
<i>Preretirement Death Benefit Eligibility</i>	Judges	Six or more years of service.
	All others	Death occurring while the member is an employee of a participating employer or within 120 days of termination provided the employee does not withdraw the account balance or retire, or a result of injuries received while in the service of a participating employer.
<i>Preretirement Death Benefit</i>	Judges	The spouse shall receive a life pension equal to two-thirds of the service retirement allowance. The beneficiary of an unmarried judge shall receive the member's accumulated contributions with interest.
	All others	The member's account balance plus a matching employer amount.
<i>Additional Police & Fire Death Benefits</i>	Upon the death of a retired police officer or firefighter, the surviving spouse or dependent children under age 18 will receive a monthly benefit based on 25% of the cash refund retirement allowance due to police and fire service.	
<i>Disability Benefit Eligibility</i>	Duty	Disablement occurring as a direct result of a job-related injury or illness, regardless of length of service.
	Non-Duty	Disablement occurring after ten years of service (six years, if a judge), but prior to normal retirement eligibility.

<i>Disability Benefits</i>	<p>The normal retirement allowance calculated based on the service credit that would have been earned if the member had continued working to age 58 (age 55 for police and fire, age 65 for judge members) payable commencing immediately.</p> <p>Fire and Police Members' Alternative</p> <p>In lieu of the above, firefighters and police officers who qualify for duty disability may elect to receive a benefit of 50% of final average monthly salary at the time of disablement.</p> <p>Minimum Monthly Retirement Allowance</p> <p>Judges 45% of final average monthly salary.</p> <p>All others \$100 for a member with at least 15 years of creditable service, actuarially reduced if an optional form of benefit is chosen.</p>
	<p>Reduction of Benefits</p> <p>Whenever a disabled employee's disability benefit and earned income for any month exceed the monthly salary received at the time of disablement or \$400, if greater, the disability benefit will be reduced by the excess.</p> <p>For Tier Two members, the disability benefit may not exceed the member's salary at the time of disablement.</p>
<i>Waiting Time Service Purchases</i>	<p>Members with at least 10 years of combined credited and/or prior service under PERS may elect to purchase service credit for the six-month "waiting time" period worked prior to establishing membership in the system. The waiting time purchase is interest-free and must be purchased in one payment prior to retirement.</p>
<i>Police & Fire Unit Purchases</i>	<p>Police & fire members may purchase 60-month annuity benefits (up to \$80 per month) that must be paid out by age 65 and cannot commence prior to the earliest retirement age. The amount purchased by the member is matched by the employer. In certain situations, such as termination of employment prior to retiring, or working beyond age 65, the employer's matching purchase is forfeited.</p>
<i>Automatic Postretirement Cost of Living Adjustments (COLAs)</i>	<p>All monthly pension and annuity benefits except unit purchases are eligible for postretirement adjustments. As a result of the Senate Bills 822 and 861 and the Oregon Supreme Court decision in <i>Moro v. State of Oregon</i>, automatic postretirement adjustments are based on a blended COLA as described below.</p> <p>Automatic COLA prior to SB 822 and SB 861</p> <p>Benefits were adjusted annually to reflect the increase or decrease in the Consumer Price Index (Portland area - all items) as published by the Bureau of Labor Statistics.</p> <p>The maximum adjustment to be made for any year was 2% of the previous year's benefit. Any CPI change in excess of the limit was accumulated for future benefit adjustments which would otherwise be less than the limit. No benefit was decreased below its original amount.</p> <p>Automatic Adjustments Provided by Senate Bills 822 and 861</p> <p>This legislation, passed in 2013, provided for that benefits would be increased annually based on a marginal rate schedule. The increase is calculated as 1.25% on the first \$60,000 of annual benefit and 0.15% on amounts above \$60,000 of annual benefit.</p>

	Blended COLA after Moro decision	The Supreme Court decision in <i>Moro</i> requires that members “will be entitled to receive during retirement a blended COLA rate that reflects the different COLA provisions applicable to benefits earned at different times.” The Supreme Court did not articulate a specific methodology for determining the blended COLA. For purposes of this valuation, we have determined the blend based on creditable service earned before and after October 2013. This approach is consistent with OAR 459-005-0510 adopted by the PERS Board in September 2015.
<i>Ad Hoc Adjustments</i>		From time to time, as granted by the Legislature, retired members and beneficiaries have received increases in their monthly benefits.
<i>Variable Annuity Program</i>	Contributions	Prior to January 1, 2004, a member could elect to have 25, 50 or 75 percent of his or her contributions invested in the variable account.
	Benefit	At retirement, a member may elect to receive a variable annuity with the funds accumulated in his or her variable account. Alternatively, a member may elect to have all or a portion of the funds in his or her variable account transferred back to the regular account and receive an annuity from the System as though no variable annuity program existed. The employer-provided benefit, however, is based on the earnings the member would have received in the regular account.
<i>Interest Credit on Member Accounts</i>	Tier 1 Regular	Actuarially assumed rate of return until the rate guarantee reserve has been fully funded for three consecutive years and the Board elects to credit additional interest.
	Tier 2 Regular	Amount determined by the Board based on actual investment earnings of the regular account.
	Variable	Actual earnings in variable account.
<i>Retiree Healthcare – Medicare Supplement (RHIA)</i>	Retiree Eligibility	All of the following must be met: <ul style="list-style-type: none"> (a) Currently receiving a retirement allowance from the System, (b) Covered for eight years before retirement, (c) Enrolled in a PERS-sponsored health plan, and (d) Enrolled in both Medicare Part A and Part B.
	Surviving Spouse or Dependent Eligibility	A surviving spouse or dependent of a deceased RHIA-eligible retiree is eligible for RHIA benefits if they are enrolled in both Medicare Part A and Part B, and <i>either</i> of the following criteria are met: <ul style="list-style-type: none"> (a) Currently receiving a retirement allowance from the System, or (b) The surviving spouse or dependent was covered under the eligible retiree’s PERS-sponsored health insurance at the time of the retiree’s death and the deceased retiree retired before May 1, 1991.

	Benefit Amount	A monthly contribution of up to \$60 per retiree is applied to PERS-sponsored Medicare supplemental insurance costs.																
<i>Retiree Healthcare – Under Age 65 (RHIPA)</i>	Retiree Eligibility	Retired PERS members who were state employees at the time of retirement, are enrolled in a PERS-sponsored health plan, and are not eligible for Medicare.																
	Surviving Spouse or Dependent Eligibility	A surviving spouse or dependent of a deceased RHIPA-eligible retiree is eligible for RHIPA benefits if they are not yet eligible for Medicare, and <i>either</i> of the following criteria are met: (a) Currently receiving a retirement allowance from the System, or (b) The surviving spouse or dependent was covered under the eligible retiree’s PERS-sponsored health plan at the time of the retiree’s death and the deceased retiree retired on or after September 29, 1991.																
	Benefit	A percentage (as shown in the table below) of the maximum monthly subsidy based on years of service. The maximum monthly subsidy is calculated annually as the average difference between the health insurance premiums paid by active state employees and the premium retirees would pay if they were rated separately from active state employees. The maximum monthly subsidy for 2016 is \$326.94 per month.																
		<table border="1"> <thead> <tr> <th>Years of Service with State Employer</th> <th>Subsidized Amount</th> </tr> </thead> <tbody> <tr> <td>Under 8</td> <td>0%</td> </tr> <tr> <td>8-9</td> <td>50%</td> </tr> <tr> <td>10-14</td> <td>60%</td> </tr> <tr> <td>15-19</td> <td>70%</td> </tr> <tr> <td>20-24</td> <td>80%</td> </tr> <tr> <td>25-29</td> <td>90%</td> </tr> <tr> <td>30 & Over</td> <td>100%</td> </tr> </tbody> </table>	Years of Service with State Employer	Subsidized Amount	Under 8	0%	8-9	50%	10-14	60%	15-19	70%	20-24	80%	25-29	90%	30 & Over	100%
Years of Service with State Employer	Subsidized Amount																	
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20-24	80%																	
25-29	90%																	
30 & Over	100%																	
<i>Changes in Plan Provisions</i>	There were no changes in the Tier 1/Tier 2 benefit provisions reflected since the December 31, 2015 actuarial valuation.																	

Summary of Chapter 238A Provisions — OPSRP

<i>Normal Retirement Date</i>	Police & Fire Age 60 or age 53 with 25 years of retirement credit General Service Age 65 or age 58 with 30 years of retirement credit School Districts Age 65 or age 58 with 30 calendar years of active membership
<i>Normal Retirement Allowance</i>	A single life annuity equal to final average salary times years of retirement credit attributable to service as fire and police times 1.8% plus final average salary times all other years of retirement credit times 1.5%
<i>Final Average Salary</i>	<p>The greater of:</p> <ul style="list-style-type: none"> • Average salary earned during the three calendar years in which the member was paid the highest salary, even if one of those years is less than a full calendar year. • Total salary earned over the last 36 months of employment divided by the actual months of service during that 36 month period. <p>Covered salary for this purpose includes base pay, plus overtime up to an average amount, plus bonuses, plus member contributions paid by the employer on a salary reduction basis. Excludes payments of unused vacation or accumulated sick leave at retirement, and member contributions “assumed and paid” by the employer.</p>
<i>Early Retirement Eligibility</i>	Police & Fire Age 50 and 5 years of vesting service General Service Age 55 and 5 years of vesting service
<i>Early Retirement Allowance</i>	Normal retirement allowance, actuarially reduced to early retirement age.
<i>Vesting</i>	Five years or attainment of normal retirement age.
<i>Vested Termination Benefit</i>	Same as normal (or early) retirement allowance, but commencement is deferred to normal (or early) retirement date.
<i>Optional Forms of Retirement Benefit</i>	<p>The normal form of benefit is a life annuity. All optional amounts are adjusted to be actuarially equivalent.</p> <p>Options Available</p> <ul style="list-style-type: none"> • Life annuity • Joint and 50% or 100% survivor contingent benefit, with or without pop-up feature • Lump sum if monthly normal retirement benefit is less than \$200 or if lump sum value is less than \$5,000.
<i>Preretirement Death Benefit Eligibility</i>	Death of a vested member before retirement benefits begin.
<i>Preretirement Death Benefit</i>	If member was eligible for early retirement, the actuarial equivalent of 50% of the early retirement benefit the participant was eligible to receive at date of death. If member was not eligible for early retirement, the actuarial equivalent of 50% of the early retirement benefit the participant would have been eligible to receive if he terminated employment on his date of death and retired at the earliest possible date.

<i>Disability Benefit Eligibility</i>	Duty	Disablement occurring as a direct result of a job-related injury or illness, regardless of length of service.
	Non-Duty	Disablement occurring after ten years of service, but prior to normal retirement eligibility.
<i>Disability Benefit Amounts</i>	Preretirement Benefit	45% of salary during last full month of employment before disability, reduced if the total benefit exceeds 75% of salary. Benefit is payable monthly until normal retirement age.
	Retirement Benefit	Same formula as Normal Retirement Benefit, except: Final average salary is adjusted to reflect cost-of-living increases from date of disability to normal retirement age, and Retirement credits continue to accrue from date of disability to normal retirement age.
<i>Postretirement Adjustments</i>	All monthly pension and annuity benefits except unit purchases are eligible for postretirement adjustments. As a result of the Senate Bills 822 and 861 and the Oregon Supreme Court decision in <i>Moro v. State of Oregon</i> , automatic postretirement adjustments are based on a blended COLA as described below.	
	Automatic COLA prior to SB 822 and SB 861	Benefits were adjusted annually to reflect the increase or decrease in the Consumer Price Index (Portland area - all items) as published by the Bureau of Labor Statistics. The maximum adjustment to be made for any year was 2% of the previous year's benefit. Any CPI change in excess of the limit was accumulated for future benefit adjustments which would otherwise be less than the limit. No benefit was decreased below its original amount.
	Automatic Adjustments Provided by Senate Bills 822 and 861	This legislation, passed in 2013, provided for that benefits would be increased annually based on a marginal rate schedule. The increase is calculated as 1.25% on the first \$60,000 of annual benefit and 0.15% on amounts above \$60,000 of annual benefit.
<i>Changes in Plan Provisions</i>	There were no changes in the OPSRP benefit provisions reflected since the December 31, 2015 actuarial valuation.	

Glossary

Glossary

Actuarial Accrued Liability. The portion of the present value of prospective benefits allocated to service and compensation before the valuation date in accordance with the actuarial cost method.

Actuarial Asset Value. The value of assets used in calculating the required contributions. The actuarial asset value may be equal to the fair market value of assets, or it may spread the recognition of certain investment gains or losses over a period of years in accordance with an asset valuation method.

Actuarial Assumptions. Assumptions as to the occurrence of future events affecting pension costs, such as: mortality, withdrawal, disablement and retirement; rates of investment earnings and other relevant items.

Actuarial Cost Method. Sometimes called “funding method,” a particular technique used by actuaries to establish the amount and incidence of the annual actuarial cost of pension plan benefits, or normal cost, and the related unfunded accrued liability. Ordinarily, the annual contribution to the plan comprises the normal cost and an amount for amortization of the unfunded accrued liability.

Actuarial Gain or (Loss). A measure of the difference between actual experience and that expected based upon a set of actuarial assumptions, during the period between two actuarial valuation dates, as determined in accordance with a particular actuarial cost method.

Combined Valuation Payroll. Projected payroll subject to PERS employer contribution rates for the calendar year following the valuation date for Tier 1, Tier 2 and OPSRP active members. This payroll is used to calculate UAL rates.

Employer Contribution Rate. Consists of the normal cost rate and the UAL rates, plus adjustments for items such as side account rate offsets.

Fundamental Cost Equation. An expression of the long-term cost of a pension plan, which states that:

$$\text{Benefits} + \text{Expenses} = \text{Contributions} + \text{Investment Earnings}$$

Funded Status. The actuarial value of assets expressed as a percentage of the actuarial accrued liability.

Normal Cost. The annual cost allocated to the current year, under the actuarial cost method in use. The normal cost divided by the applicable payroll is the normal cost rate.

OPSRP Valuation Payroll. Projected payroll subject to PERS employer contribution rates for the calendar year following the valuation date for OPSRP active members. This payroll is used to calculate OPSRP normal cost rates.

Pre-SLGRP Liability/(Surplus). The sum of Pre-SLGRP Pooled Liabilities and Transition Liabilities.

Pre-SLGRP Pooled Liability/(Surplus). The difference between the total UAL and the UAL attributable to the SLGRP for a pool of employers that joined the SLGRP. There are currently two pre-SLGRP pools. One was created for State Agencies and Community Colleges when the SLGRP was formed. The other one was created when the Local Government Rate Pool joined the SLGRP.

Present Value. Sometimes called “actuarial present value,” the estimated cost (as of the valuation date) of a series of future payments. The present value is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

Present Value of Future Normal Cost (PVFNC). The present value (as of the valuation date) of all future annual normal costs for current members expected to be allocated to future years in accordance with the actuarial cost method in use. By definition, this is equal to the difference between the total actuarial present value of benefits less the actuarial accrued liability under the actuarial cost method.

Rate Collar. A methodology that defines the maximum permissible period-to-period change in the base employer contribution rate. The width of the rate collar is determined by the current contribution rate and funded status.

Required Supplementary Information (RSI). Schedules, statistical data, and other information that are an essential part of financial reporting and should be presented with, but are not part of, the basic financial statements of a governmental entity.

Statement No. 67 of the Governmental Accounting Standards Board (GASB 67). The accounting standard establishing financial reporting standards for defined benefit pension plans. The standard replaced GASB Statement 25 for plan fiscal years beginning after June 15, 2013.

Statement No. 68 of the Governmental Accounting Standards Board (GASB 68). The accounting standard governing a governmental employer's accounting for pensions. The standard replaced GASB Statement 27 for employer fiscal years beginning after June 15, 2014.

Statement No. 74 of the Governmental Accounting Standards Board (GASB 74). The accounting standard establishing financial reporting standards for post-employment benefits other than pensions. The standard replaced GASB Statement 43 for plan fiscal years beginning after June 15, 2016.

Statement No. 75 of the Governmental Accounting Standards Board (GASB 75). The accounting standard governing a governmental employer's accounting for post-employment benefits other than pensions. The standard replaced GASB Statement 45 for employer fiscal years beginning after June 15, 2017.

Tier 1/Tier 2 Valuation Payroll. Projected payroll subject to PERS employer contribution rates for the calendar year following the valuation date for Tier 1 and Tier 2 active members. This payroll is used to calculate Tier 1/Tier 2 normal cost rates.

Total Actuarial Present Value of Benefits. Sometimes referred to simply as "Present Value of Benefits" (PVB) or "Total Liability", the present value of all prospective benefits projected to be paid to current plan members. This amount is equal to the sum of the actuarial accrued liability and the present value of future normal costs, and is unaffected by the choice of actuarial cost method.

Transition Liability/(Surplus). The difference between the total UAL and the UAL attributable to the SLGRP for an individual employer that joined the SLGRP or the Local Government Rate Pool.

Unfunded Accrued Liability (UAL). The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. The UAL is divided by combined valuation payroll and an amortization factor to determine an initial, pre-collar UAL rate. The final UAL rate can be adjusted by the rate collar.