

North Dakota Public Employees Retirement System

Actuarial Valuation as of July 1, 2017



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October 25, 2017

Board Members
North Dakota Public Employees Retirement System
Bismarck, North Dakota

Members of the Board:

We are pleased to provide our formal annual Actuarial Valuation Report as of July 1, 2017, for the North Dakota Public Employees Retirement System (“NDPERS”). The actuarial valuation was performed at the request of the Board and is intended for use by the Board and NDPERS and those designated by the Board and NDPERS. This report may be provided to parties other than the Board and NDPERS only in its entirety and only with the permission of the Board and NDPERS. GRS is not responsible for unauthorized use of this report.

This report provides, among other things, the actuarial employer contribution to the NDPERS for the Plan Year commencing July 1, 2017, and ending on June 30, 2018. This actuarial valuation also provides information required by GASB Statement No. 67. Information required by GASB Statement No. 68 and the employer allocation of the Net Pension Liability are provided in a separate report. This report should not be relied on for any purpose other than the purpose described herein.

The actuarial valuation was based upon information furnished by the NDPERS Staff, concerning benefits provided by the North Dakota Public Employees Retirement System, financial transactions, plan provisions and census data for active members, terminated members, retirees and beneficiaries as of July 1, 2017. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by the NDPERS Staff.

The Board approved the following changes to the actuarial assumptions beginning with the July 1, 2017 actuarial valuation:

- The investment return assumption was lowered from 8.00 percent to 7.75 percent;
- The price inflation assumption was lowered from 3.50 percent to 2.50 percent;
- The payroll growth assumption used in calculating the amortization of the unfunded liability contribution for the actuarial contribution rate was lowered from 4.50 percent to 3.75 percent for Main System and Law Enforcement and from 4.00 percent to 3.25 percent for Judges;
- The asset valuation method was updated to smooth total investment gains or losses compared to the investment return assumption over a five-year period. Net deferred asset gains attributable to fiscal years 2016 and prior were fully recognized as of July 1, 2017

All other actuarial assumptions and the actuarial cost method are unchanged from the last actuarial valuation as of July 1, 2016. They were based on an experience review for the five-year period ending July 1, 2014, which

was performed by the prior actuary, and were first adopted for use commencing with the July 1, 2015, actuarial valuation.

Contributions to PERS are based on fixed statutory contribution rates. Based on the current actuarial valuation and the current actuarial assumptions and methods and benefit provisions, the current statutory employer contribution rate of 7.12% for the Main System is not expected to ever amortize the unfunded liability. The funded ratio is projected to ultimately decrease from the current funded ratio of about 70 percent. We recommend an increase to the Main System statutory employer contribution rate (to at least 9.62%) such that the unfunded liability is amortized over a period of no longer than 30 years and the funded ratio will increase toward 100%.

The plan provisions are unchanged from the last actuarial valuation as of July 1, 2016.

To the best of our knowledge the information contained in this report is accurate and fairly presents the actuarial position of the North Dakota Public Employees Retirement System as of the valuation date. All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

Lance J. Weiss and Amy Williams are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

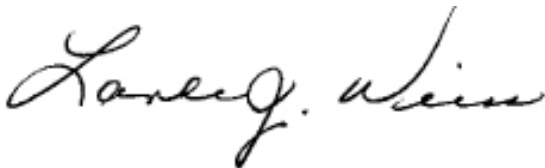
The signing actuaries are independent of the plan sponsor.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan 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 plan's funded status); and changes in plan provisions or applicable law.

We will be pleased to review this report with you at your convenience.

Respectfully submitted,

Gabriel, Roeder, Smith & Company



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SECTION A

ACTUARIAL VALUATION RESULTS

Comments on the Actuarial Valuation

Purpose

At your request, we have performed an actuarial valuation of the North Dakota Public Employees Retirement System as of July 1, 2017:

- To determine the funding status of the System as of the actuarial valuation date;
- To determine the actuarial employer contribution rate for the fiscal year beginning July 1, 2017; and
- To provide other data required by NDPERS.

Pension plan financial reporting under GASB Statement No. 67 is provided in Section D of this report. Employer financial reporting under GASB Statement No. 68 is provided in a separate report.

Membership Data

We received the data from the North Dakota Public Employees Retirement System Staff. We performed certain checks for reasonableness and found the data to be complete and reliable for actuarial valuation purposes. However, we did not audit the data.

A total of 23,243 active members (including the Main System, Judges and Law Enforcement) were included in the actuarial valuation as of July 1, 2017. Between the 2016 and 2017 actuarial valuations, the number of active employees decreased by 173 members, or 0.7 percent. The average annual valuation pay increased by 2.2 percent, from \$44,779 to \$45,750 between the 2016 and 2017 actuarial valuations. There were 6,283 active members who were eligible for retirement (normal, early or Rule of 85) as of July 1, 2017.

The number of benefit recipients (excluding three members receiving benefits under the Special Prior Service Plan as of July 1, 2016) increased from 10,515 to 11,103, or 5.6 percent, since the last actuarial valuation. The average monthly benefit increased by 4.0 percent, from \$1,135 to \$1,181. During the year ending June 30, 2017, there were 904 members awarded a benefit.

There were 5,903 inactive members as of July 1, 2017, who were vested and elected to receive a deferred benefit. The average monthly deferred benefit is \$531. There were 5,751 inactive members as of July 1, 2017, who were not vested or elected to receive a refund of contributions.

Section C summarizes the membership data.

Plan Provisions

Section F outlines the principal benefit provisions of the System. There were no changes since the previous valuation.

Comments on the Actuarial Valuation (Continued)

Actuarial Assumptions and Methods

The Board approved the following changes to the actuarial assumptions beginning with the July 1, 2017 actuarial valuation:

- The investment return assumption was lowered from 8.00 percent to 7.75 percent;
- The price inflation assumption was lowered from 3.50 percent to 2.50 percent;
- The payroll growth assumption used in calculating the amortization of the unfunded liability contribution for the actuarial contribution rate was lowered from 4.50 percent to 3.75 percent for Main System and Law Enforcement and from 4.00 percent to 3.25 percent for Judges;
- The asset valuation method was updated to smooth total investment gains or losses compared to the investment return assumption over a five-year period. Net deferred asset gains attributable to fiscal years 2016 and prior were fully recognized as of July 1, 2017.

All other actuarial assumptions used in the actuarial valuation as of July 1, 2017, were based on an experience review for the five-year period ending July 1, 2014, which was performed by the prior actuary, and were first adopted for use commencing with the July 1, 2015, valuation.

Section E outlines the actuarial assumptions and methods used in the actuarial valuation. The assumption for administrative expenses is equal to the prior years' administrative expenses, adjusted for inflation. In total, this amount has increased from \$2,626,622 to \$2,672,424.

The actuarial contribution rate is calculated using a 20-year open period, level percentage of payroll amortization method. The remaining amortization period will be reset to 20 years in each future actuarial valuation.

Plan Asset Return

On a market value basis, NDPERS assets had an investment return of approximately 12.90 percent (net of investment expenses). On an actuarial value of asset basis, NDPERS assets had an investment return of approximately 8.98 percent on an actuarial value of assets basis, which compares to the prior year assumed rate of return of 8.00 percent.

The actuarial value of assets is currently 96.1 percent of the market value of assets. There is \$94,636,957 in net asset gains currently being deferred that will be phased into the actuarial value of assets over the next four years.

Gain/Loss Analysis

During the plan year ending June 30, 2017, the unfunded actuarial accrued liability ("UAAL") decreased from \$1,131,287,826 as of July 1, 2016, to \$1,093,616,455 as of July 1, 2017, which is a decrease of \$37,671,371. The key factors contributing to the decrease in the UAAL were changes in actuarial assumptions. The unfunded actuarial accrued liability based on the market value of assets increased from \$981,669,810 to \$998,979,497.

Comments on the Actuarial Valuation (Continued)

Funded Ratio

The funded ratio measures the portion of the actuarial accrued liability (calculated based on the actuarial assumptions disclosed in this report) that is currently funded. The total PERS funded ratio is 70.7 percent on an actuarial value of assets basis and 73.2 percent on a market value of assets basis as of July 1, 2017.

The funded ratio for the Main System is 69.9 percent, the funded ratio for the Judges System is 117.4 percent, the funded ratio for the Law Enforcement with prior Main System service plan is 80.0 percent and the funded ratio for the Law Enforcement without prior Main System service plan is 100.5 percent as of July 1, 2017. The funded ratios based on the market value of assets are approximately 2 to 4 percentage points higher than the funded ratios based on the actuarial value of assets.

The funded ratio and unfunded actuarial accrued liability are appropriate for assessing the need for and the amount of future unfunded liability contributions (excludes normal cost contributions). They are not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the System's benefit obligations.

Employer Contributions

The actuarially determined contribution rate is calculated as the normal cost contribution (to fund benefits accruing during the year) plus a contribution to amortize the unfunded liability. The unfunded liability contribution rate is calculated using a 20-year open period, level percentage of payroll amortization method. The remaining amortization period will be reset to 20 years in each future actuarial valuation. If employers contributed the actuarial contribution rate, the contribution rate would be expected to gradually decrease using a 20-year open amortization period as the funded ratio gradually increased. An open amortization period is expected to gradually improve the funded ratio. However, the funded ratio is not expected to reach 100 percent under this method (assuming no actuarial gains or losses) because the remaining unfunded liability at each future valuation date is re-amortized over a new 20-year period.

The contributions that are made by employers are based on fixed contribution rates that are set by statute (and not based on the actuarially determined rate). The statutory contribution rate is significantly lower than the actuarial contribution rate for the Main System, significantly higher than the actuarial contribution rate for Judges and higher than the actuarial rate for the Law Enforcement Systems. Because the Main System comprises the majority of the liability and contribution requirement for the Combined System, the statutory contribution rate for the total PERS is also significantly lower than the actuarial contribution rate.

The portion of the statutory contribution that is applied toward the unfunded liability is the statutory contribution rate minus the employer normal cost rate. The unfunded liability contribution rate from the statutory contribution is significantly lower than the rate calculated using the 20-year level percentage of payroll amortization period. The unfunded liability contribution rate from the statutory contribution for the Main System rate is not high enough to amortize the unfunded liability over any period of time.

Comments on the Actuarial Valuation (Continued)

Because the statutory employer rate is higher than the actuarial employer rate (based on a 20-year amortization period) for the Judges and Law Enforcement Systems, the statutory employer rate amortizes the unfunded liability over a period shorter than 20 years.

We recommend an increase to the statutory contribution rate such that the unfunded liability is amortized over a period of no longer than 30 years. Based on the current actuarial valuation and the current actuarial assumptions and methods and benefit provisions, the current statutory employer contribution rate of 7.12% for the Main System is not expected to ever amortize the unfunded liability. The funded ratio is projected to ultimately decrease from the current funded ratio of about 70 percent. We recommend an increase to the Main System statutory employer contribution rate (to at least 9.62%) such that the unfunded liability is amortized over a period of no longer than 30 years and the funded ratio will increase toward 100%.

Historical Trends

The funded ratio (based on the actuarial value of assets) for the total PERS declined during the past 10 years from a high of 92.6 percent in 2008, to a low of 62.0 percent in 2013, and increased to the current funded ratio of 70.7 percent.

Summary of Actuarial Valuation Results (Total PERS)

	July 1, 2016 Results	July 1, 2017 Results
Membership Data		
Active Members	23,416	23,243
Special Prior Service Members	3	0
Inactive Vested and Non-Vested Members	10,733	11,654
Retirees and Beneficiaries	10,515	11,103
TOTAL	44,667	46,000
Plan Liabilities		
Actuarial Accrued Liability:		
Active Members	\$ 1,837,073,997	\$ 1,975,808,158
Special Prior Service Members	1,040	-
Inactive Vested and Non-Vested Members	212,315,346	261,705,723
Retirees and Beneficiaries	1,347,175,084	1,489,301,206
TOTAL	\$ 3,396,565,467	\$ 3,726,815,087
Actuarial Value of Assets at Valuation Date	\$ 2,265,277,641	\$ 2,633,198,632
Unfunded (Overfunded) Actuarial Accrued Liability	\$ 1,131,287,826	\$ 1,093,616,455
Funded Position of Plan's Actuarial Accrued Liability ¹	66.7 %	70.7 %
Actuarial Contribution Requirement		
	Fiscal Year 2017	Fiscal Year 2018
Annual Normal Cost as of Valuation Date	\$ 113,148,379	\$ 122,827,757
Normal Cost Expense Load	2,626,622	2,672,424
Amortization Payment	78,948,023	79,382,308
Total Actuarial Contribution Requirement	194,723,024	204,882,489
Expected Employee Contributions	78,158,824	79,168,391
Actuarial Employer Contribution Requirement	\$ 116,564,200	\$ 125,714,098
Projected Annual Compensation	\$ 1,122,879,138	\$ 1,137,707,702
Actuarial Employer Contribution % of Projected Annual Compensation		
Main System	10.48%	11.20%
Judges	8.90%	4.81%
Law Enforcement with prior Main System service	8.08%	8.25%
Law Enforcement without prior Main System service	6.44%	6.77%
Total PERS (Combined)	10.38%	11.05%
Statutory Employer Contribution % of Projected Annual Compensation		
Main System	7.12%	7.12%
Judges	17.52%	17.52%
Law Enforcement with prior Main System service	9.81%	9.81%
Law Enforcement without prior Main System service	7.93%	7.93%
Total PERS (Combined)	7.27%	7.27%

¹ Equals the ratio of the actuarial value of assets to the total actuarial accrued liability.

Contribution Rate by Plan

All PERS Plans

	Main System			Judges			Law Enforcement with prior Main System Service		
	July 1, 2017	July 1, 2016	Change	July 1, 2017	July 1, 2016	Change	July 1, 2017	July 1, 2016	Change
Actuarial Employer Contribution Requirement (\$)	\$ 122,272,212	\$ 112,981,892	\$ 9,290,320	\$ 393,904	\$ 734,399	\$ (340,495)	\$ 2,602,245	\$ 2,514,672	\$ 87,573
<u>Actuarial Employer Contribution Requirement (% of Payroll)</u>									
Employer Normal Cost Contribution Requirement	3.96%	3.24%	0.72%	11.36%	10.40%	0.96%	5.42%	4.92%	0.50%
Employer UAL Contribution Requirement	7.24%	7.24%	0.00%	-6.55%	-1.50%	-5.05%	2.83%	3.16%	-0.33%
Total Actuarial Employer Contribution Requirement (%)	11.20%	10.48%	0.72%	4.81%	8.90%	-4.09%	8.25%	8.08%	0.17%
Actuarial Employer Contribution Rate	11.20%	10.48%	0.72%	4.81%	8.90%	-4.09%	8.25%	8.08%	0.17%
Statutory Employer Contribution Rate	7.12%	7.12%	0.00%	17.52%	17.52%	0.00%	9.81%	9.81%	0.00%
Statutory Rate Deficit/(Surplus) Compared to Actuarial Rate	4.08%	3.36%	0.72%	-12.71%	-8.62%	-4.09%	-1.56%	-1.73%	0.17%
Employer UAL Contribution from Statutory Rate	3.16%	3.88%	-0.72%	6.16%	7.12%	-0.96%	4.39%	4.89%	-0.50%
Amortization Period from Statutory Rate (Years)	Infinite*	69.9	NA	None	None	NA	11.1	11.3	(0.2)
Actuarial Value of Assets (AVA)	\$2,529,631,008	\$ 2,180,748,616	\$ 348,882,392	\$ 47,856,615	\$ 41,526,834	\$ 6,329,781	\$ 49,254,041	\$ 39,779,332	\$ 9,474,709
Market Value of Assets (MVA)	2,620,545,753	2,324,783,623	295,762,130	49,576,578	44,269,616	5,306,962	51,024,228	42,406,694	8,617,534
AVA Unfunded Liability	1,088,452,965	1,118,632,484	(30,179,519)	(7,092,753)	(1,707,391)	(5,385,362)	12,289,006	14,085,816	(1,796,810)
MVA Unfunded Liability	997,538,220	974,597,477	22,940,743	(8,812,716)	(4,450,173)	(4,362,543)	10,518,819	11,458,454	(939,635)
AVA Funded Ratio	69.9%	66.1%	3.8%	117.4%	104.3%	13.1%	80.0%	73.8%	6.2%
MVA Funded Ratio	72.4%	70.5%	1.9%	121.6%	111.2%	10.4%	82.9%	78.7%	4.2%
Market Value Actuarial Employer Contribution Rate	10.60%	9.55%	1.05%	3.22%	6.48%	-3.26%	7.84%	7.49%	0.35%
<u>Law Enforcement without prior Main System service</u>									
<u>Combined Main System, Judges and Law Enforcement</u>									
	July 1, 2017	July 1, 2016	Change	July 1, 2017	July 1, 2016	Change			
Actuarial Employer Contribution Requirement (\$)	\$ 445,737	\$ 333,237	\$ 112,500	\$ 125,714,098	\$ 116,564,200	\$ 9,149,898			
<u>Actuarial Employer Contribution Requirement (% of Payroll)</u>									
Employer Normal Cost Contribution Requirement	6.81%	6.07%	0.74%	4.07%	3.35%	0.72%			
Employer UAL Contribution Requirement	-0.04%	0.37%	-0.41%	6.98%	7.03%	-0.05%			
Total Actuarial Employer Contribution Requirement (%)	6.77%	6.44%	0.33%	11.05%	10.38%	0.67%			
Actuarial Employer Contribution Rate	6.77%	6.44%	0.33%	11.05%	10.38%	0.67%			
Statutory Employer Contribution Rate	7.93%	7.93%	0.00%	7.27%	7.27%	0.00%			
Statutory Rate Deficit/(Surplus) Compared to Actuarial Rate	-1.16%	-1.49%	0.33%	3.78%	3.11%	0.67%			
Employer UAL Contribution from Statutory Rate	1.12%	1.86%	-0.74%	3.20%	3.92%	-0.72%			
Amortization Period from Statutory Rate (Years)	None	3.1	NA	Infinite*	60.7	NA			
Actuarial Value of Assets (AVA)	\$ 6,456,968	\$ 3,222,859	\$ 3,234,109	\$ 2,633,198,632	\$ 2,265,277,641	\$ 367,920,991			
Market Value of Assets (MVA)	6,689,031	3,435,724	3,253,307	2,727,835,589	2,414,895,657	312,939,932			
AVA Unfunded Liability	(32,763)	276,917	(309,680)	1,093,616,455	1,131,287,826	(37,671,371)			
MVA Unfunded Liability	(264,826)	64,052	(328,878)	998,979,498	981,669,810	17,309,688			
AVA Funded Ratio	100.5%	92.1%	8.4%	70.7%	66.7%	4.0%			
MVA Funded Ratio	104.1%	98.2%	5.9%	73.2%	71.1%	2.1%			
Market Value Actuarial Employer Contribution Rate	6.52%	6.15%	0.37%	10.44%	3.35%	7.09%			

* The unfunded liability contribution rate from the statutory employer contribution rate of 7.12% for the Main System is not high enough to amortize the unfunded liability over any period of time.

Actuarial Valuation Results

All PERS Plans

	Valuation as of July 1, 2017								July 1, 2016			
	Main System	%	Judges	%	Law Enforcement w/ Prior	%	Law Enforcement w/o Prior	%	Total	% of Payroll	Total	% of Payroll
Active Members												
Number	22,574		54		498		117		23,243		23,416	
Average Age	46.4		56.8		37.4		38.9		46.2		46.3	
Average Years of Benefit Service	9.7		9.3		7.0		4.4		9.6		9.6	
Average Years of Vesting Service	9.8		14.8		7.8		5.1		9.7		9.7	
Total Payroll	\$ 1,020,843,253		\$ 7,866,090		\$ 28,765,678		\$ 5,896,777		\$ 1,063,371,798		\$ 1,048,548,467	
Projected Annual Compensation	\$ 1,091,425,558		\$ 8,180,733		\$ 31,521,157		\$ 6,580,254		\$ 1,137,707,702		\$ 1,122,879,138	
Special Prior Service Members												
Number	-		-		-		-		-		3	
Total Benefits	\$ -		\$ -		\$ -		\$ -		\$ -		\$ 377	
Inactive Vested and Non-Vested Members												
Number	11,336		4		229		85		11,654		10,733	
Total Benefits	\$ 36,642,516		\$ 172,408		\$ 643,783		\$ 132,955		\$ 37,591,661		\$ 32,307,525	
Retired Members and Beneficiaries												
Number	10,957		50		90		6		11,103		10,515	
Total Benefits	\$ 152,770,344		\$ 2,639,954		\$ 1,836,456		\$ 70,665		\$ 157,317,419		\$ 143,226,097	
Total Membership	44,867		108		817		208		46,000		44,667	
Actuarial Accrued Liability												
Active Members	\$ 1,916,436,508		\$ 16,968,362		\$ 37,617,974		\$ 4,785,314		\$ 1,975,808,158		\$ 1,837,073,997	
Special Prior Service Members	-		-		-		-		-		1,040	
Inactive Vested and Non-Vested Members	254,886,944		1,208,173		4,719,643		890,963		261,705,723		212,315,346	
Retired Members and Beneficiaries	<u>1,446,760,521</u>		<u>22,587,327</u>		<u>19,205,430</u>		<u>747,928</u>		<u>1,489,301,206</u>		<u>1,347,175,084</u>	
Total	3,618,083,973		40,763,862		61,543,047		6,424,205		3,726,815,087		3,396,565,467	
Actuarial Value of Assets	\$ 2,529,631,008		\$ 47,856,615		\$ 49,254,041		\$ 6,456,968		\$ 2,633,198,632		\$ 2,265,277,641	
Unfunded Actuarial Accrued Liability	\$ 1,088,452,965		\$ (7,092,753)		\$ 12,289,006		\$ (32,763)		\$ 1,093,616,455		\$ 1,131,287,826	
Funded Ratio (Actuarial Value of Assets)	69.9%		117.4%		80.0%		100.5%		70.7%		66.7%	
Annual Gross Normal Cost												
Benefits	\$ 117,029,448	(10.72%)	\$ 1,572,110	(19.22%)	\$ 3,424,078	(10.86%)	\$ 802,121	(12.19%)	\$ 122,827,757	(10.80%)	\$ 113,148,379	(10.08%)
Expenses of Administration	<u>2,614,397</u>	<u>(0.24%)</u>	<u>11,977</u>	<u>(0.14%)</u>	<u>38,141</u>	<u>(0.12%)</u>	<u>7,909</u>	<u>(0.12%)</u>	<u>2,672,424</u>	<u>(0.23%)</u>	<u>2,626,622</u>	<u>(0.23%)</u>
Total	119,643,845	(10.96%)	1,584,087	(19.36%)	3,462,219	(10.98%)	810,030	(12.31%)	125,500,181	(11.03%)	115,775,001	(10.31%)
Amortization of Unfunded Liability ¹	\$ 79,028,156	(7.24%)	\$ (535,724)	-(6.55%)	\$ 892,255	(2.83%)	\$ (2,379)	-(0.04%)	\$ 79,382,308	(6.98%)	\$ 78,948,023	(7.03%)
Actuarial Contribution Requirement												
Employer Portion	\$ 122,272,212	(11.20%)	\$ 393,904	(4.81%)	\$ 2,602,245	(8.25%)	\$ 445,737	(6.77%)	\$ 125,714,098	(11.05%)	\$ 116,564,200	(10.38%)
Employee Portion	<u>76,399,789</u>	<u>(7.00%)</u>	<u>654,459</u>	<u>(8.00%)</u>	<u>1,752,229</u>	<u>(5.56%)</u>	<u>361,914</u>	<u>(5.50%)</u>	<u>79,168,391</u>	<u>(6.96%)</u>	<u>78,158,824</u>	<u>(6.96%)</u>
Total	198,672,001	(18.20%)	1,048,363	(12.81%)	4,354,474	(13.81%)	807,651	(12.27%)	204,882,489	(18.01%)	194,723,024	(17.34%)
Actuarial Contribution	\$ 122,272,212	(11.20%)	\$ 393,904	(4.81%)	\$ 2,602,245	(8.25%)	\$ 445,737	(6.77%)	\$ 125,714,098	(11.05%)	\$ 116,564,200	(10.38%)
Statutory Employer Contribution	<u>77,709,500</u>	<u>(7.12%)</u>	<u>1,433,264</u>	<u>(17.52%)</u>	<u>3,092,226</u>	<u>(9.81%)</u>	<u>521,814</u>	<u>(7.93%)</u>	<u>82,756,804</u>	<u>(7.27%)</u>	<u>81,633,313</u>	<u>(7.27%)</u>
Statutory Contribution Deficit/(Surplus)	44,562,712	(4.08%)	(1,039,360)	-(12.71%)	(489,981)	-(1.56%)	(76,077)	-(1.16%)	42,957,294	(3.78%)	34,930,887	(3.11%)

¹ Amortization as a level percentage of payroll over a 20-year open period. Total payroll assumed to increase by 4.00% annually for the Judges and 4.50% for the Main System and Law Enforcement groups in 2016; and 3.25% annually for the Judges and 3.75% for the Main System and Law Enforcement groups in 2017.

Actuarial Valuation Results

Gain/Loss Analysis

RECONCILIATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITY

	Main System	Judges	Law Enforcement with Prior Main System Service	Law Enforcement without Prior Main System Service	Total
Unfunded liability at previous valuation	\$ 1,118,632,484	\$ (1,707,391)	\$ 14,085,816	\$ 276,917	\$ 1,131,287,826
<u>Expected unfunded liability at current valuation</u>					
Normal cost for plan year	110,394,156	1,518,782	3,263,502	598,561	115,775,001
Interest on unfunded liability and normal cost	93,821,415	(77,009)	1,254,894	45,635	95,044,935
Contributions using actuarial rate with interest to current valuation date	<u>195,857,346</u>	<u>1,449,480</u>	<u>4,413,149</u>	<u>642,127</u>	<u>202,362,102</u>
Total expected change in unfunded liability at current valuation	8,358,225	(7,707)	105,247	2,069	8,457,834
Total expected unfunded liability at current valuation	1,126,990,709	(1,715,098)	14,191,063	278,986	1,139,745,660
Change due to:					
Amount and timing of contributions (based on statutory rate)	41,428,258	(615,796)	540,264	(10,063)	41,342,663
Amount and timing of administrative expenses	(18,080)	(543)	(1,727)	(358)	(20,708)
Recognition of asset (gains)/losses	(22,653,955)	(392,774)	(573,618)	(90,933)	(23,711,280)
Salary experience	(6,933,984)	(106,637)	(993,976)	(95,943)	(8,130,540)
Retirement experience	4,155,508	(679,127)	176,433	(11,690)	3,641,124
Withdrawal experience	1,818,929	5,213	231,242	(45,460)	2,009,924
Disability experience	216,180	4,223	(1,672)	(3,215)	215,516
Death in Service experience	10,199	(43,116)	(1,004)	598	(33,323)
Death After Retirement experience	(23,326,844)	(1,515,852)	(243,196)	(17,162)	(25,103,054)
New entrants ¹	2,710,824	128,887	591,693	(431,058)	3,000,346
Data changes and other experience	20,536,458	(203,988)	(116,645)	572,162	20,787,987
Change in actuarial assumptions ²	(56,481,237)	(1,958,145)	(1,509,851)	(178,627)	(60,127,860)
Changes in plan provisions	-	-	-	-	-
Total change	<u>(38,537,744)</u>	<u>(5,377,655)</u>	<u>(1,902,057)</u>	<u>(311,749)</u>	<u>(46,129,205)</u>
Unfunded liability at current valuation	\$ 1,088,452,965	\$ (7,092,753)	\$ 12,289,006	\$ (32,763)	\$ 1,093,616,455

RECONCILIATION OF ACTUARIAL CONTRIBUTION RATE

	Main System	Judges	Law Enforcement with Prior Main System Service	Law Enforcement without Prior Main System Service
FY 2017 Actuarial Employer Contribution	10.48%	8.90%	8.08%	6.44%
Expected FY 2018 Actuarial Employer Contribution ¹	10.22%	8.95%	7.96%	6.42%
Change due to:				
Amount and timing of contributions (based on statutory rate) ³	0.25%	-0.52%	0.12%	-0.01%
Amount and timing of administrative expenses	0.00%	-0.01%	-0.01%	-0.01%
Recognition of asset (gains)/losses	-0.14%	-0.33%	-0.12%	-0.11%
Salary experience	0.12%	-0.11%	-0.10%	-0.12%
Retirement experience	0.03%	-0.58%	0.04%	-0.01%
Withdrawal experience	0.01%	0.00%	0.05%	-0.06%
Disability experience	0.00%	0.01%	0.00%	-0.01%
Death in Service experience	0.00%	-0.04%	0.00%	0.00%
Death After Retirement experience	-0.15%	-1.30%	-0.05%	-0.02%
New entrants ¹	0.81%	0.92%	0.61%	0.29%
Data changes and other experience	0.14%	-0.19%	-0.02%	0.60%
Change in actuarial assumptions ²	-0.09%	-1.99%	-0.23%	-0.19%
Changes in plan provisions	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>
Total change	0.98%	-4.14%	0.29%	0.35%
FY 2018 Actuarial Employer Contribution	11.20%	4.81%	8.25%	6.77%
FY 2018 Statutory Employer Contribution	7.12%	17.52%	9.81%	7.93%

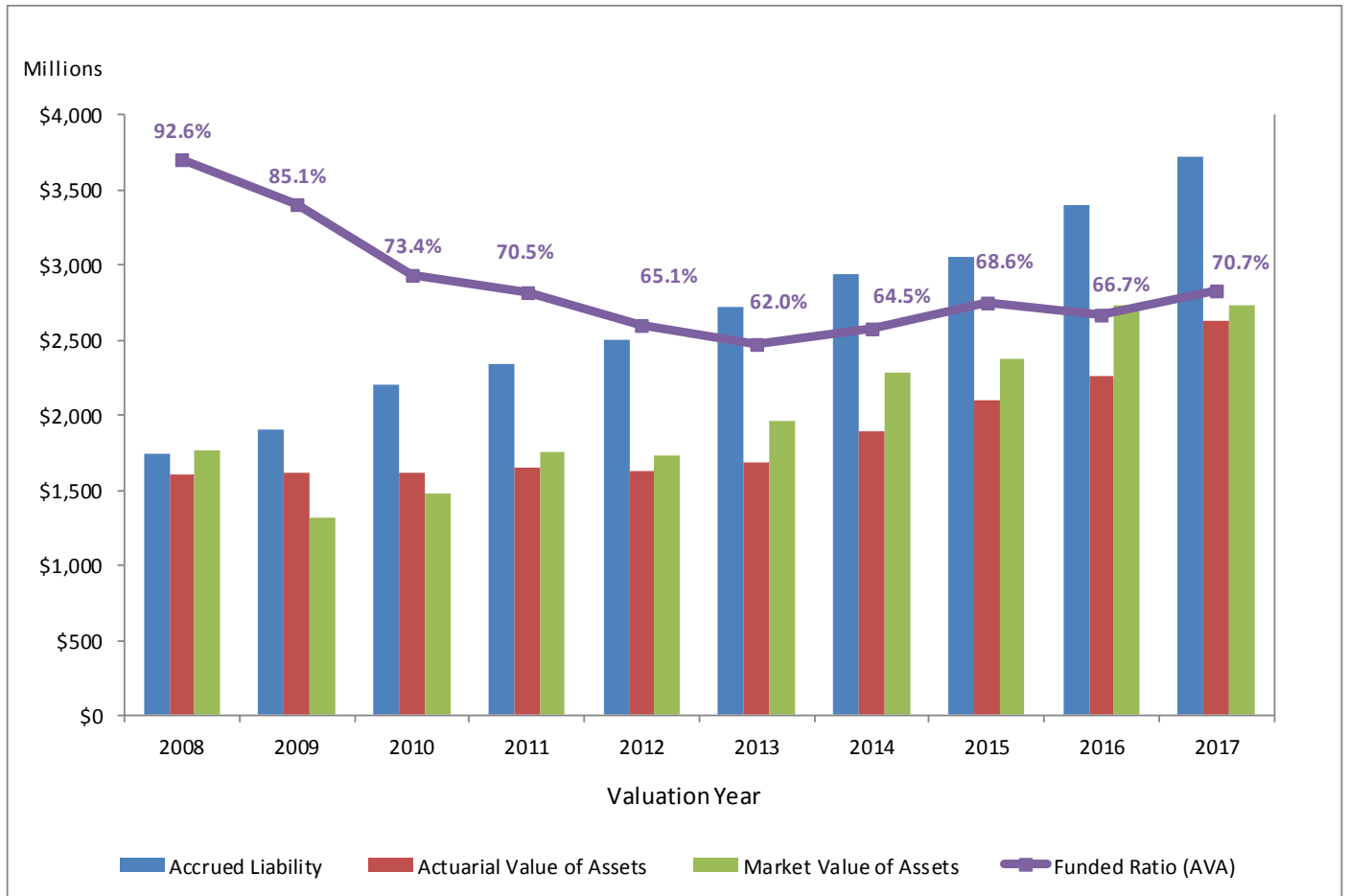
¹ New entrants change includes the net impact of liability and asset transfers.

² Includes difference in liability due to changes in the investment return assumption, inflation assumption and difference in asset value due to full recognition of net deferred asset gains attributable to fiscal years 2016 and prior under the updated asset smoothing method.

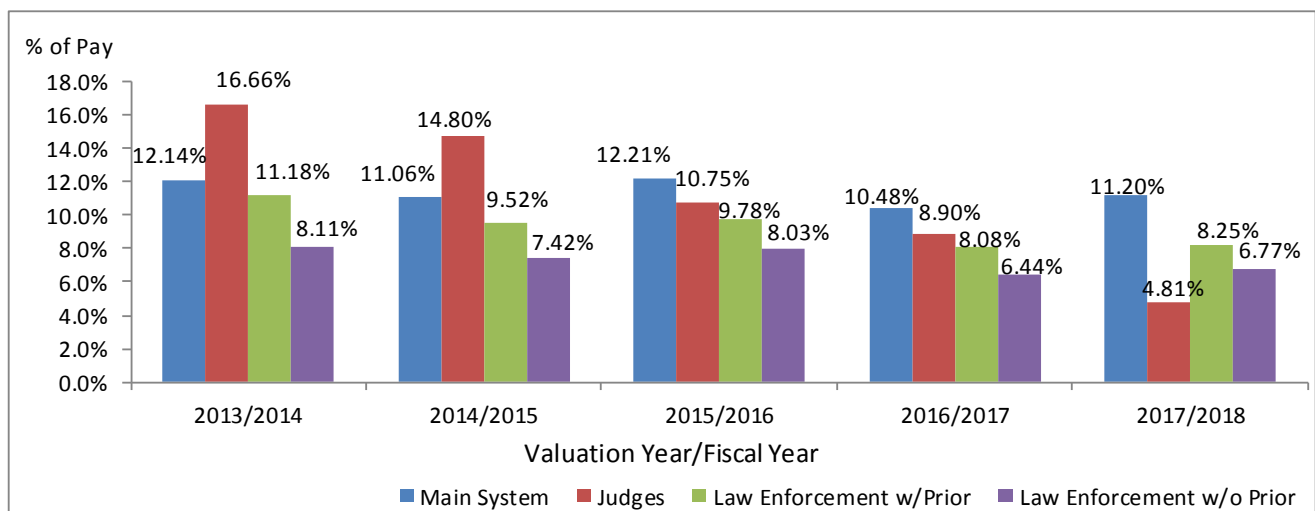
³ Expected actuarial contribution rate is based on contributions using the actuarial rate. The change due to amount and timing of contributions is based on the statutory contributions that were made compared to the actuarial contributions.

Historical Trends of Funded Ratio and Employer Contributions

Funded Ratio History



Actuarial Employer Contribution Rate History



Values prior to July 1, 2016, were calculated by the prior actuary.

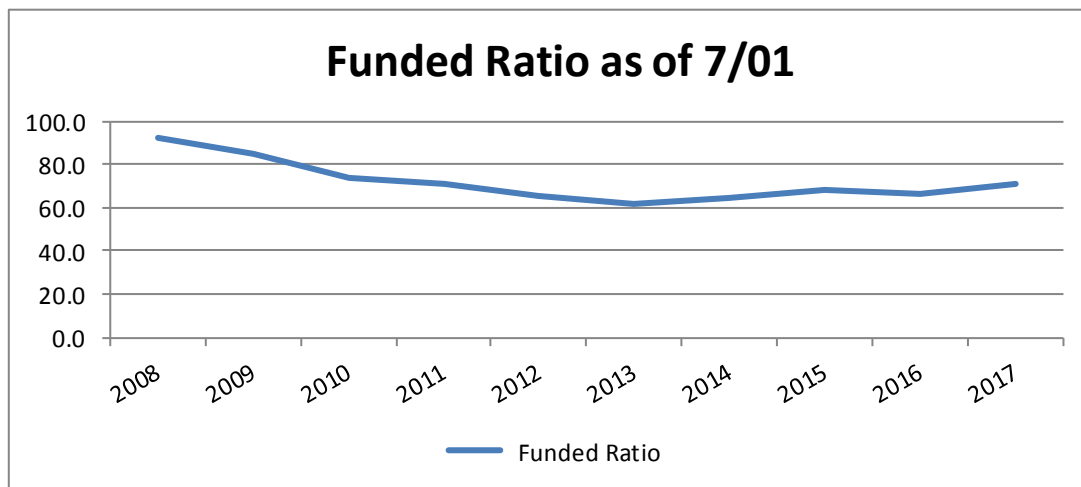
Actuarial Valuation Results All PERS Plans (\$ in Millions)

Valuation Date 7/1	Total Actuarial Accrued Liability	(1)	(2)	(3)	Actuarial Value of Assets	Portion (%) of Actuarial Accrued Liability By Assets		
		Active Member Contributions	Retirees, Beneficiaries, and Inactive Members	Active Members (Employer Financed Portion)		(1)	(2)	(3)
2007	\$1,609.2	\$433.7	\$611.3	\$565.2	\$1,503.1	100%	100%	81%
2008	1,737.6	468.1	655.7	613.8	1,609.8	100%	100%	79%
2009	1,901.2	507.6	728.1	665.5	1,617.1	100%	100%	57%
2010	2,208.4	600.5	822.2	785.7	1,621.7	100%	100%	25%
2011	2,339.8	588.3	908.3	843.2	1,650.5	100%	100%	18%
2012	2,501.3	626.2	1,070.7	804.4	1,627.4	100%	94%	0%
2013	2,716.5	687.9	1,126.0	902.6	1,683.0	100%	88%	0%
2014	2,938.8	746.5	1,255.4	936.9	1,895.8	100%	92%	0%
2015	3,052.4	788.3	1,437.0	827.1	2,094.3	100%	91%	0%
2016	3,396.6	879.3	1,559.5	957.8	2,265.3	100%	89%	0%
2017	3,726.8	943.0	1,751.0	1,032.8	2,633.2	100%	97%	0%

Values prior to July 1, 2016, were calculated by the prior actuary.

Funded Ratio History

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)
07/01/2008	\$ 1,609,810,300	\$ 1,737,627,000	\$ 127,816,700	92.6 %
07/01/2009	1,617,147,800	1,901,200,800	284,053,000	85.1
07/01/2010	1,621,723,100	2,208,386,100	586,663,000	73.4
07/01/2011	1,650,463,700	2,339,833,200	689,369,500	70.5
07/01/2012	1,627,395,600	2,501,331,500	873,935,900	65.1
07/01/2013	1,682,958,500	2,716,494,800	1,033,536,300	62.0
07/01/2014	1,895,837,700	2,938,752,200	1,042,914,500	64.5
07/01/2015	2,094,251,400	3,052,446,500	958,195,100	68.6
07/01/2016	2,265,277,641	3,396,565,467	1,131,287,826	66.7
07/01/2017	2,633,198,632	3,726,815,087	1,093,616,455	70.7



Values prior to July 1, 2016, were calculated by the prior actuary and rounded to the nearest \$100.

SECTION B

ASSET EXHIBITS

Statement of Fiduciary Net Position (Total PERS)

	Fiscal Year Ending	
	June 30, 2016	June 30, 2017
Assets		
Cash	\$ 9,317,857	\$ 9,176,368
Receivables		
Contribution receivable	12,753,464	11,982,919
Interest receivable	5,765,507	5,163,165
Due from other fiduciary funds	309,308	190,306
Due from Uniform Group Insurance Plan	-	49,490
Due from other state agencies	-	2,320
Total receivables	<u>18,828,279</u>	<u>17,388,200</u>
Investments		
Equities	1,278,735,642	2,702,830,591
Fixed income	546,274,647	-
Real estate	447,464,886	-
Mutual funds	-	-
Annuities	-	-
Alternative investments	77,800,359	-
Invested cash	<u>37,566,289</u>	<u>-</u>
Total Investments	<u>2,387,841,823</u>	<u>2,702,830,591</u>
Prepaid expenses	-	-
Invested Securities Lending Collateral	24,042,640	15,515,708
Capital assets (net of depreciation/ amortization)	<u>1,691,598</u>	<u>1,301,494</u>
Total assets	<u>2,441,722,197</u>	<u>2,746,212,361</u>
Liabilities		
Salaries payable	103,819	108,984
Accounts payable	2,520,453	2,499,120
Due to other fiduciary funds	25,861	101,328
Due to Uniform Group Insurance Plan	13,325	27,316
Securities Lending Collateral	24,042,640	15,515,708
Due to other state agencies	11,713	9,527
Accrued compensated absences	<u>108,729</u>	<u>114,789</u>
Total liabilities	<u>26,826,540</u>	<u>18,376,772</u>
Net position restricted for pensions	<u>\$ 2,414,895,657</u>	<u>\$ 2,727,835,589</u>

Statement of Changes in Fiduciary Net Position (Total PERS)

	Fiscal Year Ending	
	June 30, 2016	June 30, 2017
Additions		
Contributions:		
From employer	\$ 77,080,576	\$ 78,933,571
From employee	74,218,276	76,007,456
Transfer from general fund	1,890	-
Transfers from other plans	23,573,047	-
Total contributions	<u>174,873,789</u>	<u>154,941,027</u>
Investment income:		
Net change in fair value of investments	(38,325,802)	259,040,633
Interest and dividends	56,512,739	59,994,114
Less investment expense	(7,132,911)	(7,492,083)
Net investment income	<u>11,054,026</u>	<u>311,542,664</u>
Securities Lending Income	279,098	218,199
Repurchase service credit	9,179,163	11,805,070
Miscellaneous income	<u>712</u>	<u>32,183</u>
Total additions	<u>195,386,788</u>	<u>478,539,143</u>
Deductions		
Benefits paid to participants	141,263,796	153,811,029
Refunds	8,001,696	8,941,330
Transfers to other plans	398,649	239,609
	<u>149,664,141</u>	<u>162,991,968</u>
Administrative expenses	<u>2,537,799</u>	<u>2,607,243</u>
Total deductions	<u>152,201,940</u>	<u>165,599,211</u>
Change in net position	43,184,848	312,939,932
Net position restricted for pensions		
Beginning of year	<u>2,371,710,809</u>	<u>2,414,895,657</u>
End of year	<u>\$ 2,414,895,657</u>	<u>\$ 2,727,835,589</u>

Market Value of Assets by Plan (Total PERS)

	Fiscal Year Ending									
	June 30, 2016					June 30, 2017				
	Main System	Judges	Law Enforcement with Prior Main System Service	Law Enforcement without Prior Main System Service	Total PERS	Main System	Judges	Law Enforcement with Prior Main System Service	Law Enforcement without Prior Main System Service	Total PERS
Additions										
Contributions:										
From employer	\$ 72,960,488	\$ 1,364,327	\$ 2,384,097	\$ 371,664	\$ 77,080,576	\$ 74,023,555	\$ 1,407,326	\$ 3,005,338	\$ 497,352	\$ 78,933,571
From employee	71,996,797	622,985	1,342,588	255,906	74,218,276	73,287,125	642,611	1,698,637	379,083	76,007,456
Transfer from general fund	1,890	-	-	-	1,890	-	-	-	-	-
Transfers from other plans	12,241,447	-	11,331,600	-	23,573,047	-	-	-	-	-
Total contributions	157,200,622	1,987,312	15,058,285	627,570	174,873,789	147,310,680	2,049,937	4,703,975	876,435	154,941,027
Investment income	7,488,893	211,606	3,338,511	15,016	11,054,026	299,507,510	5,743,052	5,702,555	589,548	311,542,664
Securities Lending Income	279,098	-	-	-	279,098	218,199	-	-	-	218,199
Repurchase service credit	8,905,606	111,586	98,463	63,508	9,179,163	9,784,908	-	156,309	1,863,853	11,805,070
Miscellaneous income	712	-	-	-	712	32,183	-	-	-	32,183
Total additions	173,874,931	2,310,504	18,495,259	706,094	195,386,788	456,853,480	7,792,989	10,562,839	3,329,836	478,539,143
Deductions										
Total Benefits, Refunds and Transfers	145,864,485	2,166,615	1,577,846	55,195	149,664,141	158,544,085	2,474,960	1,906,070	66,853	162,991,968
Administrative expenses	2,481,187	11,685	37,211	7,716	2,537,799	2,547,265	11,067	39,235	9,676	2,607,243
Total deductions	148,345,672	2,178,300	1,615,057	62,911	152,201,940	161,091,350	2,486,027	1,945,305	76,529	165,599,211
Change in net position	25,529,259	132,204	16,880,202	643,183	43,184,848	295,762,130	5,306,962	8,617,534	3,253,307	312,939,932
Net position restricted for pensions										
Beginning of year	2,299,254,364	44,137,412	25,526,492	2,792,541	2,371,710,809	2,324,783,623	44,269,616	42,406,694	3,435,724	2,414,895,657
End of year	\$ 2,324,783,623	\$ 44,269,616	\$ 42,406,694	\$ 3,435,724	\$ 2,414,895,657	\$ 2,620,545,753	\$ 49,576,578	\$ 51,024,228	\$ 6,689,031	\$ 2,727,835,589

Development of Actuarial Value of Assets (Total PERS)

Fiscal Year Ending	2017	2018	2019	2020	2021
Beginning of Year:					
(1) Market Value of Assets	\$ 2,414,895,657				
(2) Actuarial Value of Assets ¹	2,414,895,657				
End of Year:					
(3) Market Value of Assets	2,727,835,589				
(4a) Contributions (Incl. repurchase svc credit)	166,996,479				
(4b) Net Disbursements	165,599,211				
(5) Total Investment Income	311,542,664				
=(3)-(1)-(4a)+(4b)					
(6) Projected Rate of Return	8.00%				
(7) Projected Investment Income					
=(1)x(6)+([1+(6)] ⁵ -1)x(4a-4b)	193,246,468				
(8) Asset Adjustment	-				
(9) Investment Income in Excess of Projected Income	118,296,196				
(10) Excess Investment Income Recognized					
This Year (5 year recognition)					
(10a) From This Year	\$ 23,659,239				
(10b) From One Year Ago	0	\$ 23,659,239			
(10c) From Two Years Ago	0	0	\$ 23,659,239		
(10d) From Three Years Ago	0	0	0	\$ 23,659,239	
(10e) From Four Years Ago	0	0	0	0	\$ 23,659,240
(10f) Total Recognized Investment Gain/(Loss)	23,659,239	23,659,239	23,659,239	23,659,239	23,659,240
(11) Change in Actuarial Value of Assets					
=(4a)-(4b)+(7)+(8)+(10f)	218,302,975				
End of Year:					
(3) Market Value of Assets	\$ 2,727,835,589				
(12) Final Actuarial Value of Assets as of 6/30 = (2)+(11)	\$ 2,633,198,632				
(13) Difference Between Market & Actuarial Values	94,636,957				
(14) Estimated Market Value Rate of Return on Total Plan Assets	12.90%				
(15) Actuarial Value Rate of Return	8.98%				
(16) Ratio of Actuarial Value to Market Value	96.5%				

¹Asset gains and losses in FY 2016 and prior are fully recognized as of July 1, 2017, and the asset gain/loss from FY 2017 will be smoothed in over a five-year period.

Actuarial Value of Assets by Plan (PERS and HPRS)

Valuation as of July 1, 2017							
	Main System	Judges	Law Enforcement with Prior	Law Enforcement without Prior	Highway Patrol	Total	Total PERS
Market Value of Assets	\$ 2,620,545,753	\$ 49,576,578	\$ 51,024,228	\$ 6,689,031		\$ 2,727,835,589	\$ 2,727,835,589
% of Total	96.07%	1.82%	1.87%	0.25%		100.00%	100.00%
Actuarial Value of Assets	\$ 2,529,631,008	\$ 47,856,615	\$ 49,254,041	\$ 6,456,968		\$ 2,633,198,632	\$ 2,633,198,632
% of Total	96.07%	1.82%	1.87%	0.25%		100.00%	100.00%
Ratio of Actuarial Value to Market Value	96.53%	96.53%	96.53%	96.53%		96.53%	96.53%
Difference between Market Value and Actuarial Value	\$ 90,914,745	\$ 1,719,963	\$ 1,770,187	\$ 232,063		\$ 94,636,957	\$ 94,636,957
Valuation as of July 1, 2016							
	Main System	Judges	Law Enforcement with Prior	Law Enforcement without Prior	Highway Patrol	Total	Total PERS
Market Value of Assets	\$ 2,324,783,623	\$ 44,269,616	\$ 42,406,694	\$ 3,435,724	\$ 65,811,337	\$ 2,480,706,994	\$ 2,414,895,657
% of Total	93.71%	1.78%	1.71%	0.14%	2.65%	100.00%	97.35%
Actuarial Value of Assets	\$ 2,180,748,616	\$ 41,526,834	\$ 39,779,332	\$ 3,222,859	\$ 61,733,910	\$ 2,327,011,551	\$ 2,265,277,641
% of Total	93.71%	1.78%	1.71%	0.14%	2.65%	100.00%	97.35%
Ratio of Actuarial Value to Market Value	93.80%	93.80%	93.80%	93.80%	93.80%	93.80%	93.80%
Difference between Market Value and Actuarial Value	\$ 144,035,007	\$ 2,742,782	\$ 2,627,362	\$ 212,865	\$ 4,077,427	\$ 153,695,443	\$ 149,618,016

Market value of assets by plan provided by NDPERS Staff.

Actuarial value of assets by plan allocated based on the proportion of the market value of assets as of the valuation date. Beginning with the valuation as of July 1, 2017, the market value of assets for Highway Patrol is not combined with market value of assets for PERS to allocate the actuarial value of assets. The market value of assets for Highway Patrol is disclosed in a separate actuarial valuation report for Highway Patrol.

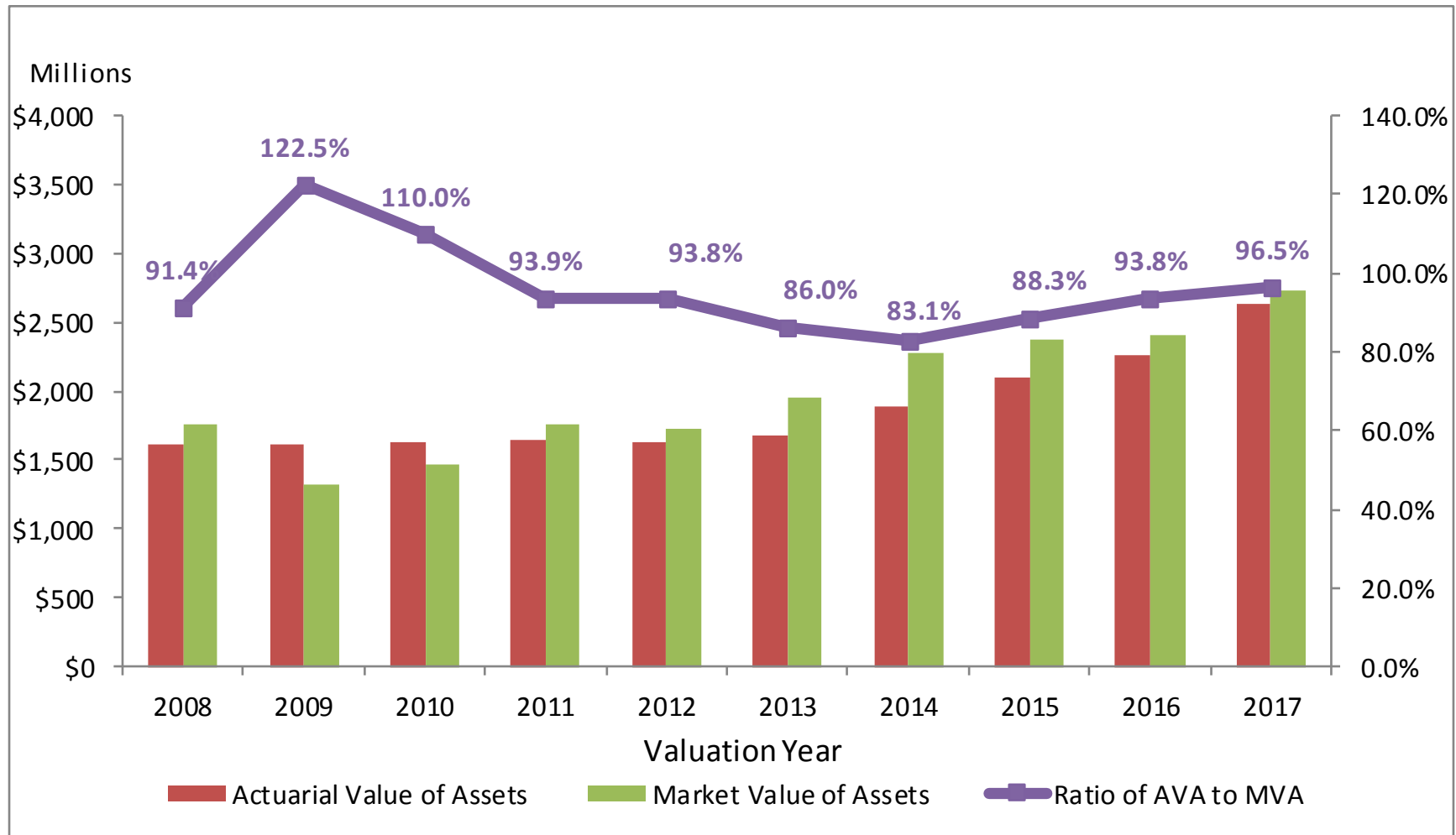
Changes in Actuarial Value of Assets (Total PERS)

Date	Employer Contributions	Member Contributions ¹	Transfers From/(To) Other Funds	Administrative Expenses	Benefit Payments and Refunds	Actuarial Value Investment Income	Actuarial Value of Assets at End of Year	Market Value of Assets at End of Year
7/1/2008	\$25,253,902	\$27,351,026	\$3,132,512	\$(1,118,233)	\$(74,938,198)	\$126,989,439	\$1,609,810,342	\$1,761,223,031
7/1/2009	27,705,267	29,970,355	(496,073)	(1,260,812)	(76,090,737)	27,509,459	1,617,147,801	1,320,003,286
7/1/2010	30,253,093	32,584,909	(210,638)	(1,214,733)	(80,827,104)	23,989,771	1,621,723,099	1,474,184,982
7/1/2011	32,278,056	34,277,035	(264,686)	(1,797,287)	(88,976,102)	53,223,596	1,650,463,711	1,758,056,598
7/1/2012	38,005,854	42,587,266	(412,993)	(1,856,915)	(98,968,562)	(2,422,725)	1,627,395,636	1,734,039,896
7/1/2013	48,846,796	54,285,278	(212,500)	(2,059,315)	(109,079,601)	63,782,233	1,682,958,527	1,957,670,026
7/1/2014	61,661,050	67,719,340	(347,783)	(2,158,712)	(119,538,541)	205,543,853	1,895,837,734	2,281,582,863
7/1/2015	70,842,535	75,043,940	(584,727)	(2,365,357)	(134,397,090)	189,874,321	2,094,251,356	2,371,710,809
7/1/2016	77,080,576	83,397,439	23,176,288	(2,537,799)	(149,265,492)	139,175,273	2,265,277,641	2,414,895,657
7/1/2017	78,933,571	87,812,526	(239,609)	(2,607,243)	(162,752,359)	366,774,105	2,633,198,632	2,727,835,589
10-Year Total	490,860,700	535,029,114	23,539,791	(18,976,406)	(1,094,833,786)	1,194,439,325		

¹ Includes repurchases of service credit.

Values prior to July 1, 2016, were calculated by the prior actuary.

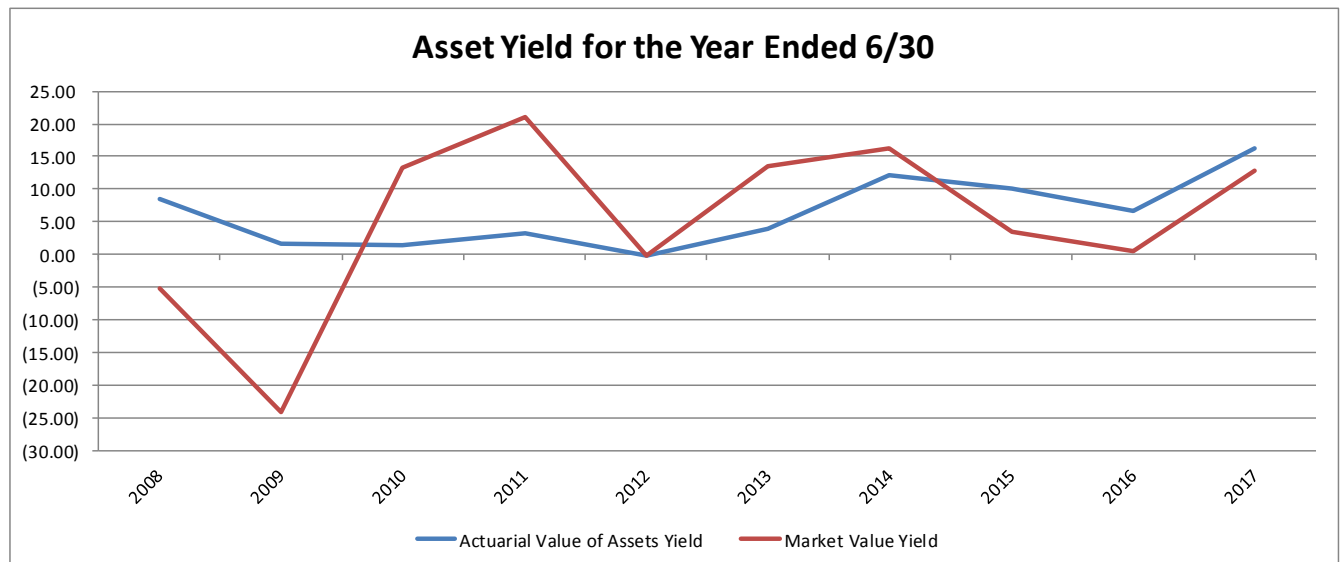
Historical Comparison of Actuarial Value of Assets to Market Value of Assets (Total PERS)



Values prior to July 1, 2016, were calculated by the prior actuary.

Historical Comparison of Total Investment Income (Total PERS)

Actuarial Valuation Date	Total Investment Income (Actuarial Assets Basis)				Total Investment Income (Market Assets Basis)			
	Non Investment Income Amount **	Amount**	Yield	Actuarial Value of Assets	Amount**	Yield	Market Value of Assets	
07/01/2008	\$ (20,318,991)	\$ 126,989,439	8.51 %	\$ 1,609,810,342	\$ (97,382,845)	(5.21) %	\$ 1,761,223,031	
07/01/2009	(20,172,000)	27,509,459	1.72	1,617,147,801	(421,047,745)	(24.04)	1,320,003,286	
07/01/2010	(19,414,473)	23,989,771	1.49	1,621,723,099	173,596,169	13.25	1,474,184,982	
07/01/2011	(24,482,984)	53,223,596	3.31	1,650,463,711	308,354,600	21.09	1,758,056,598	
07/01/2012	(20,645,350)	(2,422,725)	(0.15)	1,627,395,636	(3,371,352)	(0.19)	1,734,039,896	
07/01/2013	(8,219,342)	63,782,233	3.93	1,682,958,527	231,849,472	13.40	1,957,670,026	
07/01/2014	7,335,354	205,543,853	12.19	1,895,837,734	316,577,483	16.14	2,281,582,863	
07/01/2015	8,539,301	189,874,321	9.99	2,094,251,356	81,588,645	3.57	2,371,710,809	
07/01/2016	31,851,012	139,175,273	6.60	2,265,277,641	11,333,836	0.47	2,414,895,657	
07/01/2017	1,146,886	366,774,105	16.19	2,633,198,632	311,793,046	12.91	2,727,835,589	
10-Year Total	(64,380,587)	1,194,439,325	6.38		913,291,309	5.14		



**Amount rounded to the nearest \$100

Values prior to July 1, 2016, were calculated by the prior actuary.

SECTION C

ACTUARIAL VALUATION DATA

Summary of Participant Data (July 1, 2016, and July 1, 2017)

Valuation as of July 1, 2017					
	Main System	Judges	Law Enforcement w/ Prior Service	Law Enforcement w/o Prior Service	Total
Active Members					
Number	22,574	54	498	117	23,243
Average Age	46.4	56.8	37.4	38.9	46.2
Average Vesting Service	9.8	14.8	7.8	5.1	9.7
Total Payroll	\$ 1,020,843,253	\$ 7,866,090	\$ 28,765,678	\$ 5,896,777	\$ 1,063,371,798
Special Prior Service Pension Members					
Number	-	-	-	-	-
Total Benefits	\$ -	\$ -	\$ -	\$ -	\$ -
Inactive Members¹					
Number	5,737	4	112	50	5,903
Total Benefits	\$ 36,642,516	\$ 172,408	\$ 643,783	\$ 132,955	\$ 37,591,661
Inactive Members Elected Refunds¹					
Number	5,599	-	117	35	5,751
Total Account Balance	\$ 17,575,754	\$ -	\$ 693,099	\$ 82,890	\$ 18,351,743
Retired, Disabled, and Beneficiary Members					
Number	10,957	50	90	6	11,103
Total Benefits	\$ 152,770,344	\$ 2,639,954	\$ 1,836,456	\$ 70,665	\$ 157,317,419
Total Membership	44,867	108	817	208	46,000

Valuation as of July 1, 2016					
	Main System	Judges	Law Enforcement w/ Prior Service	Law Enforcement w/o Prior Service	Total
Active Members					
Number	22,762	56	498	100	23,416
Average Age	46.5	57.4	37.3	37.6	46.3
Average Vesting Service	9.6	10.4	6.6	3.7	9.6
Total Payroll	\$ 1,007,764,043	\$ 7,937,062	\$ 28,225,868	\$ 4,621,494	\$ 1,048,548,467
Special Prior Service Pension Members					
Number	3	-	-	-	3
Total Benefits	\$ 377	\$ -	\$ -	\$ -	\$ 377
Inactive Members¹					
Number	5,283	4	109	34	5,430
Total Benefits	\$ 31,414,596	\$ 141,972	\$ 671,947	\$ 79,010	\$ 32,307,525
Inactive Members Elected Refunds¹					
Number	5,177	-	97	29	5,303
Total Account Balance	\$ 15,584,530	\$ -	\$ 383,331	\$ 84,760	\$ 16,052,621
Retired, Disabled, and Beneficiary Members					
Number	10,391	43	79	2	10,515
Total Benefits	\$ 139,645,622	\$ 2,121,768	\$ 1,445,651	\$ 13,056	\$ 143,226,097
Total Membership	43,616	103	783	165	44,667

¹Includes transferred members.

Age/Service/Salary by Group as of July 1, 2017

Main System

Service as of Valuation Date											
Current Age	Under 5	5-9	10-14	15-19	20-24	25-29	30-34	35 and Over	Totals	Valuation Payroll	Contribution Account Balance
Under 20	44	-	-	-	-	-	-	-	44	\$ 1,077,194	\$ 49,824
20-24	786	6	-	-	-	-	-	-	792	25,565,869	2,729,151
25-29	1,558	212	3	-	-	-	-	-	1,773	69,431,961	14,935,461
30-34	1,536	694	161	5	-	-	-	-	2,396	104,487,930	36,797,816
35-39	1,326	664	407	118	1	-	-	-	2,516	115,760,771	56,896,764
40-44	1,128	618	357	344	83	2	-	-	2,532	116,149,397	77,302,127
45-49	951	592	382	333	253	121	4	-	2,636	125,132,022	108,365,676
50-54	858	622	440	393	268	282	154	10	3,027	144,840,182	161,010,813
55-59	809	632	465	511	323	303	253	183	3,479	166,090,573	230,732,909
60-64	462	440	378	355	267	207	161	221	2,491	116,246,733	177,957,808
65-69	132	132	105	104	64	49	31	56	673	28,628,847	40,009,149
70-74	32	43	34	16	7	8	9	17	166	6,086,869	9,025,493
75 and Over	11	7	9	8	2	5	2	5	49	1,344,906	1,965,703
Total	9,633	4,662	2,741	2,187	1,268	977	614	492	22,574	\$ 1,020,843,253	\$ 917,778,692

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Previous Valuation	Current Valuation	Change
Average Age: 46.5	Average Age: 46.4	(0.1)
Average Vesting Service: 9.6	Average Vesting Service: 9.8	0.2
Average Annual Pay: \$44,274	Average Annual Pay: \$45,222	\$948
Average Account Balance: \$37,605	Average Account Balance: \$40,656	\$3,051
Vested Participants 15,601	Vested Participants 15,927	326
Nonvested Participants 7,161	Nonvested Participants 6,647	(514)
Total Participants 22,762	Total Participants 22,574	(188)

Annualized Salary as of Valuation Date											
Current Age	Less Than \$20,000	\$20,000-\$29,999	\$30,000-\$39,999	\$40,000-\$49,999	\$50,000-\$59,999	\$60,000-\$69,999	\$70,000-\$79,999	\$80,000-\$89,999	\$90,000-\$99,999	\$100,000 & Over	Totals
Under 20	24	5	7	6	-	2	-	-	-	-	44
20-24	167	158	234	173	55	5	-	-	-	-	792
25-29	190	292	412	460	303	91	20	4	-	1	1,773
30-34	216	317	495	566	452	193	76	57	11	13	2,396
35-39	263	304	438	525	445	265	132	71	38	35	2,516
40-44	282	349	443	488	408	241	152	70	47	52	2,532
45-49	261	368	436	523	419	250	147	102	50	80	2,636
50-54	249	448	521	649	451	273	165	98	71	102	3,027
55-59	223	554	728	680	467	334	195	110	64	124	3,479
60-64	249	385	503	438	359	229	127	69	43	89	2,491
65-69	100	121	127	117	91	55	27	9	13	13	673
70-74	40	42	26	26	11	7	6	3	-	5	166
75 and Over	21	12	5	6	4	-	-	1	-	-	49
Total	2,285	3,355	4,375	4,657	3,465	1,945	1,047	594	337	514	22,574

Age/Service/Salary by Group as of July 1, 2017

Judges

Current Age	Service as of Valuation Date								Totals	Valuation Payroll	Contribution Account Balance
	Under 5	5-9	10-14	15-19	20-24	25-29	30-34	35 and Over			
Under 20	-	-	-	-	-	-	-	-	0	\$ -	\$ -
20-24	-	-	-	-	-	-	-	-	0	-	-
25-29	-	-	-	-	-	-	-	-	0	-	-
30-34	1	-	-	-	-	-	-	-	1	146,304	3,555
35-39	1	1	-	-	-	-	-	-	2	287,736	46,484
40-44	2	1	2	1	-	-	-	-	6	871,854	228,138
45-49	1	-	1	2	1	-	-	-	5	723,492	403,202
50-54	1	1	2	2	-	1	-	-	7	1,011,228	434,967
55-59	-	1	2	1	1	1	1	-	7	1,024,368	1,170,198
60-64	5	2	5	1	-	1	2	1	17	2,475,504	2,028,338
65-69	2	-	1	1	3	-	1	-	8	1,164,084	1,338,751
70-74	-	-	-	-	-	-	-	-	0	-	-
75 and Over	-	-	-	-	-	-	-	1	1	161,520	821,680
Total	13	6	13	8	5	3	4	2	54	\$ 7,866,090	\$ 6,475,314

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

	Previous Valuation	Current Valuation	Change
Average Age:	57.4	56.8	(0.6)
Average Vesting Service:	10.4	14.8	4.4
Average Annual Pay:	\$141,733	\$145,668	\$3,935
Average Account Balance:	\$129,737	\$119,913	(\$9,824)
Vested Participants	44	47	3
Nonvested Participants	12	7	(5)
Total Participants	56	54	(2)

Current Age	Annualized Salary as of Valuation Date										Totals
	Less Than \$20,000	\$20,000-\$29,999	\$30,000-\$39,999	\$40,000-\$49,999	\$50,000-\$59,999	\$60,000-\$69,999	\$70,000-\$79,999	\$80,000-\$89,999	\$90,000-\$99,999	\$100,000 & Over	
Under 20	-	-	-	-	-	-	-	-	-	-	0
20-24	-	-	-	-	-	-	-	-	-	-	0
25-29	-	-	-	-	-	-	-	-	-	-	0
30-34	-	-	-	-	-	-	-	-	-	1	1
35-39	-	-	-	-	-	-	-	-	-	2	2
40-44	-	-	-	-	-	-	-	-	-	6	6
45-49	-	-	-	-	-	-	-	-	-	5	5
50-54	-	-	-	-	-	-	-	-	-	7	7
55-59	-	-	-	-	-	-	-	-	-	7	7
60-64	-	-	-	-	-	-	-	-	-	17	17
65-69	-	-	-	-	-	-	-	-	-	8	8
70-74	-	-	-	-	-	-	-	-	-	-	0
75 and Over	-	-	-	-	-	-	-	-	-	1	1
Total	0	0	0	0	0	0	0	0	0	54	54

Age/Service/Salary by Group as of July 1, 2017

Law Enforcement with Prior Main System Service

Current Age	Service as of Valuation Date								Totals	Valuation Payroll	Contribution Account Balance
	Under 5	5-9	10-14	15-19	20-24	25-29	30-34	35 and Over			
Under 20	-	-	-	-	-	-	-	-	0	\$ -	\$ -
20-24	42	-	-	-	-	-	-	-	42	1,989,219	156,168
25-29	79	21	-	-	-	-	-	-	100	5,158,633	982,657
30-34	59	51	9	-	-	-	-	-	119	6,607,118	1,788,278
35-39	23	21	18	5	-	-	-	-	67	3,925,621	1,618,751
40-44	12	11	11	14	4	-	-	-	52	3,395,163	2,229,387
45-49	13	10	7	8	4	2	1	-	45	2,657,668	2,292,986
50-54	4	4	7	2	5	7	1	-	30	2,021,502	2,077,180
55-59	4	4	2	1	5	5	-	2	23	1,566,751	2,032,401
60-64	-	3	3	1	2	1	2	3	15	1,206,045	2,061,290
65-69	-	1	-	-	-	-	1	-	2	143,556	249,498
70-74	1	-	2	-	-	-	-	-	3	94,403	30,388
75 and Over	-	-	-	-	-	-	-	-	0	-	-
Total	237	126	59	31	20	15	5	5	498	\$ 28,765,678	\$ 15,518,983

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

	Previous Valuation	Current Valuation	Change
Average Age:	37.3	37.4	0.1
Average Vesting Service:	6.6	7.8	1.2
Average Annual Pay:	\$56,678	\$57,762	\$1,084
Average Account Balance:	\$29,018	\$31,163	\$2,145
Vested Participants	319	353	34
Nonvested Participants	179	145	(34)
Total Participants	498	498	0

Current Age	Annualized Salary as of Valuation Date										Totals
	Less Than \$20,000	\$20,000- \$29,999	\$30,000- \$39,999	\$40,000- \$49,999	\$50,000- \$59,999	\$60,000- \$69,999	\$70,000- \$79,999	\$80,000- \$89,999	\$90,000- \$99,999	\$100,000 & Over	
Under 20	-	-	-	-	-	-	-	-	-	-	0
20-24	-	2	9	14	9	8	-	-	-	-	42
25-29	-	1	16	39	12	25	7	-	-	-	100
30-34	1	-	4	39	30	37	6	2	-	-	119
35-39	1	-	1	15	18	23	6	1	2	-	67
40-44	-	1	-	10	8	14	10	6	2	1	52
45-49	-	1	2	10	8	17	5	2	-	-	45
50-54	-	-	-	6	5	6	7	3	1	2	30
55-59	-	-	-	3	5	7	3	1	4	-	23
60-64	-	-	-	1	1	5	2	1	1	4	15
65-69	1	-	-	-	-	-	-	-	-	1	2
70-74	1	1	-	-	1	-	-	-	-	-	3
75 and Over	-	-	-	-	-	-	-	-	-	-	0
Total	4	6	32	137	97	142	46	16	10	8	498

Age/Service/Salary by Group as of July 1, 2017

Law Enforcement without Prior Main System Service

Current Age	Service as of Valuation Date								Totals	Valuation Payroll	Contribution Account Balance
	Under 5	5-9	10-14	15-19	20-24	25-29	30-34	35 and Over			
Under 20	1	-	-	-	-	-	-	-	1	\$ 33,511	\$ 1,917
20-24	9	-	-	-	-	-	-	-	9	342,520	21,950
25-29	14	3	-	-	-	-	-	-	17	752,992	119,405
30-34	12	7	1	-	-	-	-	-	20	923,526	262,588
35-39	15	6	1	-	-	-	-	-	22	1,109,968	251,317
40-44	5	5	1	-	-	-	-	-	11	505,257	179,123
45-49	7	6	-	-	1	-	-	-	14	732,952	387,616
50-54	4	5	2	3	-	-	-	-	14	890,328	1,045,143
55-59	2	-	2	1	-	1	-	-	6	448,680	702,570
60-64	2	-	-	-	1	-	-	-	3	157,042	264,960
65-69	-	-	-	-	-	-	-	-	0	-	-
70-74	-	-	-	-	-	-	-	-	0	-	-
75 and Over	-	-	-	-	-	-	-	-	0	-	-
Total	71	32	7	4	2	1	0	0	117	\$ 5,896,777	\$ 3,236,590

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Previous Valuation	Current Valuation	Change
Average Age: 37.6	Average Age: 38.9	1.3
Average Vesting Service: 3.7	Average Vesting Service: 5.1	1.4
Average Annual Pay: \$46,217	Average Annual Pay: \$50,400	\$4,183
Average Account Balance: \$16,377	Average Account Balance: \$27,663	\$11,286
Vested Participants 54	Vested Participants 70	16
Nonvested Participants 46	Nonvested Participants 47	1
Total Participants 100	Total Participants 117	17

Current Age	Annualized Salary as of Valuation Date										Totals
	Less Than \$20,000	\$20,000- \$29,999	\$30,000- \$39,999	\$40,000- \$49,999	\$50,000- \$59,999	\$60,000- \$69,999	\$70,000- \$79,999	\$80,000- \$89,999	\$90,000- \$99,999	\$100,000 & Over	
Under 20	-	-	1	-	-	-	-	-	-	-	1
20-24	-	-	5	4	-	-	-	-	-	-	9
25-29	-	-	2	13	2	-	-	-	-	-	17
30-34	-	-	3	14	3	-	-	-	-	-	20
35-39	-	-	3	8	9	1	-	1	-	-	22
40-44	-	-	1	8	2	-	-	-	-	-	11
45-49	-	-	1	6	3	3	1	-	-	-	14
50-54	-	-	1	1	6	2	1	2	1	-	14
55-59	-	-	-	-	1	1	1	3	-	-	6
60-64	-	-	1	-	1	1	-	-	-	-	3
65-69	-	-	-	-	-	-	-	-	-	-	0
70-74	-	-	-	-	-	-	-	-	-	-	0
75 and Over	-	-	-	-	-	-	-	-	-	-	0
Total	0	0	18	54	27	8	3	6	1	-	117

Age/Service/Salary by Group as of July 1, 2017

Combined Main System, Judges and Law Enforcement

Current Age	Service as of Valuation Date								Totals	Valuation Payroll	Contribution Account Balance
	Under 5	5-9	10-14	15-19	20-24	25-29	30-34	35 and Over			
Under 20	45	-	-	-	-	-	-	-	45	\$ 1,110,705	\$ 51,742
20-24	837	6	-	-	-	-	-	-	843	27,897,608	2,907,269
25-29	1,651	236	3	-	-	-	-	-	1,890	75,343,586	16,037,523
30-34	1,608	752	171	5	-	-	-	-	2,536	112,164,878	38,852,237
35-39	1,365	692	426	123	1	-	-	-	2,607	121,084,096	58,813,315
40-44	1,147	635	371	359	87	2	-	-	2,601	120,921,671	79,938,775
45-49	972	608	390	343	259	123	5	-	2,700	129,246,134	111,449,480
50-54	867	632	451	400	273	290	155	10	3,078	148,763,240	164,568,104
55-59	815	637	471	514	329	310	254	185	3,515	169,130,372	234,638,077
60-64	469	445	386	357	270	209	165	225	2,526	120,085,324	182,312,396
65-69	134	133	106	105	67	49	33	56	683	29,936,487	41,597,399
70-74	33	43	36	16	7	8	9	17	169	6,181,272	9,055,880
75 and Over	11	7	9	8	2	5	2	6	50	1,506,426	2,787,382
Total	9,954	4,826	2,820	2,230	1,295	996	623	499	23,243	\$ 1,063,371,797	\$ 943,009,580

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

	Previous Valuation	Current Valuation	Change
Average Age:	46.3	46.2	(0.1)
Average Vesting Service:	9.6	9.7	0.1
Average Annual Pay:	\$44,779	\$45,750	\$971
Average Account Balance:	\$37,552	\$40,572	\$3,020
Vested Participants	16,018	16,397	379
Nonvested Participants	7,398	6,846	(552)
Total Participants	23,416	23,243	(173)

Current Age	Annualized Salary as of Valuation Date										Totals
	Less Than \$20,000	\$20,000-\$29,999	\$30,000-\$39,999	\$40,000-\$49,999	\$50,000-\$59,999	\$60,000-\$69,999	\$70,000-\$79,999	\$80,000-\$89,999	\$90,000-\$99,999	\$100,000 & Over	
Under 20	24	5	8	6	-	2	-	-	-	-	45
20-24	167	160	248	191	64	13	-	-	-	-	843
25-29	190	293	430	512	317	116	27	4	-	1	1,890
30-34	217	317	502	619	485	230	82	59	11	14	2,536
35-39	264	304	442	548	472	289	138	73	40	37	2,607
40-44	282	350	444	506	418	255	162	76	49	59	2,601
45-49	261	369	439	539	430	270	153	104	50	85	2,700
50-54	249	448	522	656	462	281	173	103	73	111	3,078
55-59	223	554	728	683	473	342	199	114	68	131	3,515
60-64	249	385	504	439	361	235	129	70	44	110	2,526
65-69	101	121	127	117	91	55	27	9	13	22	683
70-74	41	43	26	26	12	7	6	3	-	5	169
75 and Over	21	12	5	6	4	-	-	1	-	1	50
Total	2,289	3,361	4,425	4,848	3,589	2,095	1,096	616	348	576	23,243

Historical Schedule of Active Member Data through July 1, 2017

Valuation Date 7/1	Main System			
	Number	Annual Payroll (\$ in Millions)	Average Annual Pay ¹	% Increase in Avg Pay
2008	19,042	\$627.6	\$32,959	5.7%
2009	19,686	684.3	34,762	5.5%
2010	20,372	751.1	36,868	6.1%
2011	20,359	785.4	38,577	4.6%
2012	20,738	781.6	37,690	(2.3)%
2013	21,201	865.9	40,841	8.4%
2014	21,814	946.2	43,376	9.3%
2015	22,381	993.6	43,395	0.0%
2016	22,762	1,007.8	44,274	2.0%
2017	22,574	1,020.8	45,222	2.1%

Valuation Date 7/1	Judges			
	Number	Annual Payroll (\$ in Millions)	Average Annual Pay ¹	% Increase in Avg Pay
2008	47	\$5.2	\$111,427	7.5%
2009	47	5.4	115,741	3.9%
2010	47	5.7	120,962	4.5%
2011	49	6.2	126,474	4.6%
2012	49	6.1	124,645	(1.4)%
2013	49	6.6	134,673	8.0%
2014	50	7.0	139,290	3.4%
2015	51	7.3	142,636	2.4%
2016	56	7.9	141,733	(0.6)%
2017	54	7.9	145,668	2.8%

¹ Prior to the valuation as of July 1, 2016, annual payroll is based on projected annual compensation for the upcoming year. Beginning with the valuation as of July 1, 2016, annual payroll and average annual pay are based on annualized payroll as of the valuation date.

Values prior to July 1, 2016, were calculated by the prior actuary.

Historical Schedule of Active Member Data through July 1, 2017

Law Enforcement with Prior Main System Service				
Valuation Date 7/1	Number	Annual Payroll (\$ in Millions)	Average Annual Pay ¹	% Increase in Avg Pay
2008	177	\$7.1	\$39,674	11.2%
2009	180	7.0	38,965	(1.8)%
2010	217	11.9	54,467	39.8%
2011	226	10.1	44,908	(17.6)%
2012	239	10.8	45,074	0.4%
2013	268	13.4	49,981	10.9%
2014	315	16.7	53,121	6.3%
2015	318	18.7	58,781	10.7%
2016	498	28.2	56,678	(3.6)%
2017	498	28.8	57,762	1.9%

Law Enforcement without Prior Main System Service				
Valuation Date 7/1	Number	Annual Payroll (\$ in Millions)	Average Annual Pay ¹	% Increase in Avg Pay
2008	30	\$0.8	\$27,472	8.5%
2009	30	0.9	31,660	15.2%
2010	32	1.1	35,572	12.4%
2011	61	2.4	39,911	12.2%
2012	65	2.4	36,588	(8.3)%
2013	70	2.6	36,998	1.1%
2014	83	3.6	43,872	18.6%
2015	95	4.6	48,204	9.9%
2016	100	4.6	46,217	(4.1)%
2017	117	5.9	50,400	9.0%

¹ Prior to the valuation as of July 1, 2016, annual payroll is based on projected annual compensation for the upcoming year. Beginning with the valuation as of July 1, 2016, annual payroll and average annual pay are based on annualized payroll as of the valuation date.

Values prior to July 1, 2016, were calculated by the prior actuary.

Summary of Active Member Data as of July 1, 2017

Active Members Eligible For:	Main System	Judges	Law	Law	Total
			Enforcement with Prior Main Service	Enforcement without Prior Main Service	
Retirement					
Normal	888	9	39	8	944
Rule of 85	1,359	6	0	0	1,365
Early Retirement	<u>3,916</u>	<u>18</u>	<u>29</u>	<u>11</u>	<u>3,974</u>
Total Retirement	6,163	33	68	19	6,283
Deferred Retirement	<u>9,764</u>	<u>14</u>	<u>285</u>	<u>51</u>	<u>10,114</u>
Total Vested	15,927	47	353	70	16,397
Non-Vested	6,647	7	145	47	6,846
Grand Total	22,574	54	498	117	23,243

Schedule of Members in Pay Status as of July 1, 2017

Main System

Monthly Amount	Normal	Early	Disability	Service*	Beneficiary**	Total	Total***
Under \$200	601	535	2	6	183	1,327	1,144
\$200 - \$400	659	810	33	33	238	1,773	1,535
\$400 - \$600	574	575	39	29	175	1,392	1,217
\$600 - \$800	488	295	40	17	116	956	840
\$800 - \$1,000	561	134	20	14	50	779	729
\$1,000 - \$1,200	542	118	5	20	47	732	685
\$1,200 - \$1,400	500	46	1	41	37	625	588
\$1,400 - \$1,600	421	24	1	35	21	502	481
\$1,600 - \$1,800	381	16	0	39	20	456	436
\$1,800 - \$2,000	331	9	0	47	19	406	387
\$2,000 - \$2,200	270	4	0	45	9	328	319
\$2,200 - \$2,400	253	7	0	44	12	316	304
\$2,400 - \$2,600	204	2	0	34	4	244	240
\$2,600 - \$2,800	184	1	0	24	5	214	209
\$2,800 - \$3,000	128	2	0	15	4	149	145
\$3,000 and Over	642	1	0	95	20	758	738
Total	6,739	2,579	141	538	960	10,957	9,997
Payment Option	Normal	Early	Disability	Service*	Beneficiary**	Total	Total***
Life	3,875	1,842	120	275	202	6,314	6,112
Life 1% Graduated Benefits	1	3	0	1	0	5	5
Life 2% Graduated Benefits	3	1	0	0	0	4	4
Level Social Security Payment	85	21	0	22	0	128	128
Joint & 100% Survivor	1,687	443	13	156	502	2,801	2,299
Joint & 100% Survivor 1% Graduated Benefits	5	0	0	0	0	5	5
Joint & 100% Survivor 2% Graduated Benefits	5	1	0	1	2	9	7
Joint & 50% Survivor	944	177	8	73	217	1,419	1,202
Joint & 50% Survivor 1% Graduated Benefits	0	0	0	0	0	0	0
Joint & 50% Survivor 2% Graduated Benefits	2	1	0	1	0	4	4
20 Year C & L	38	17	0	2	20	77	57
10 Year C & L	80	64	0	5	11	160	149
10 Year C & L 1% Graduated Benefits	0	0	0	0	0	0	0
5 Year C & L	14	9	0	2	6	31	25
Total	6,739	2,579	141	538	960	10,957	9,997
Age	Normal	Early	Disability	Service*	Beneficiary**	Total	Total***
Under 50	0	0	17	1	26	44	18
50 - 54	0	0	22	27	22	71	49
55 - 59	126	47	45	153	47	418	371
60 - 64	720	391	56	149	85	1,401	1,316
65 - 69	2,030	699	1	114	118	2,962	2,844
70 - 74	1,626	488	0	61	170	2,345	2,175
75 and Over	2,237	954	0	33	492	3,716	3,224
Total	6,739	2,579	141	538	960	10,957	9,997

	Previous Valuation	Current Valuation	Change
Average Age	71.9	72.4	0.6
Average Monthly Benefit	\$1,120	\$1,162	\$42
Total Members in Pay Status	10,394	10,957	563

* Includes Rule of 85, Rule of 88 and Rule of 90.

** Includes alternate payees.

*** Total excluding beneficiaries.

Schedule of Members in Pay Status as of July 1, 2017

Judges

Monthly Amount	Normal	Early	Disability	Service*	Beneficiary**	Total	Total***
Under \$400	0	0	0	0	0	0	0
\$400 - \$800	0	0	0	0	1	1	0
\$800 - \$1,200	1	0	0	0	0	1	1
\$1,200 - \$1,600	2	0	0	0	1	3	2
\$1,600 - \$2,000	0	2	0	0	2	4	2
\$2,000 - \$2,400	0	0	0	0	0	0	0
\$2,400 - \$2,800	1	0	0	0	1	2	1
\$2,800 - \$3,200	3	0	0	0	2	5	3
\$3,200 - \$3,600	2	1	0	0	1	4	3
\$3,600 - \$4,000	3	1	0	0	0	4	4
\$4,000 - \$4,400	0	0	0	0	1	1	0
\$4,400 - \$4,800	5	0	0	0	1	6	5
\$4,800 - \$5,200	2	0	0	0	2	4	2
\$5,200 - \$5,600	1	0	0	0	0	1	1
\$5,600 - \$6,000	2	0	0	0	0	2	2
\$6,000 and Over	10	0	1	0	1	12	11
Total	32	4	1	0	13	50	37
Payment Option	Normal	Early	Disability	Service*	Beneficiary**	Total	Total***
Life	0	0	0	0	4	4	0
Level Social Security Payment	0	0	0	0	0	0	0
Joint & 100% Survivor	20	2	0	0	8	30	22
Joint & 50% Survivor	12	2	1	0	1	16	15
10 Year C & L	0	0	0	0	0	0	0
5 Year C & L	0	0	0	0	0	0	0
Total	32	4	1	0	13	50	37
Age	Normal	Early	Disability	Service*	Beneficiary**	Total	Total***
Under 50	0	0	0	0	0	0	0
50 - 54	0	0	0	0	0	0	0
55 - 59	0	0	1	0	0	1	1
60 - 64	0	1	0	0	0	1	1
65 - 69	12	1	0	0	6	19	13
70 - 74	6	0	0	0	3	9	6
75 and Over	14	2	0	0	4	20	16
Total	32	4	1	0	13	50	37

	Previous Valuation	Current Valuation	Change
Average Age	73.7	73.4	-0.3
Average Monthly Benefit	\$4,112	\$4,400	\$288
Total Members in Pay Status	43	50	7

* Includes Rule of 85, Rule of 88 and Rule of 90.

** Includes alternate payees.

*** Total excluding beneficiaries.

Schedule of Members in Pay Status as of July 1, 2017

Law Enforcement with prior Main System Service

Monthly Amount	Normal	Early	Disability	Service*	Beneficiary**	Total	Total***
Under \$200	3	1	0	0	3	7	4
\$200 - \$400	1	1	0	0	2	4	2
\$400 - \$600	4	2	0	1	1	8	7
\$600 - \$800	3	1	0	1	2	7	5
\$800 - \$1,000	3	1	0	2	0	6	6
\$1,000 - \$1,200	8	0	1	1	0	10	10
\$1,200 - \$1,400	2	0	0	0	0	2	2
\$1,400 - \$1,600	7	2	0	0	0	9	9
\$1,600 - \$1,800	3	0	0	0	0	3	3
\$1,800 - \$2,000	1	1	0	1	0	3	3
\$2,000 - \$2,200	4	0	0	2	0	6	6
\$2,200 - \$2,400	2	0	0	2	0	4	4
\$2,400 - \$2,600	1	1	0	0	0	2	2
\$2,600 - \$2,800	2	0	0	0	0	2	2
\$2,800 - \$3,000	1	0	0	0	0	1	1
\$3,000 and Over	11	1	0	4	0	16	16
Total	56	11	1	14	8	90	82
Payment Option	Normal	Early	Disability	Service*	Beneficiary**	Total	Total***
Life	25	5	1	5	0	36	36
Level Social Security Payment	1	4	0	1	0	6	6
Joint & 100% Survivor	18	2	0	7	2	29	27
Joint & 100% Survivor 1% Graduated Benefits	1	0	0	0	0	1	1
Joint & 50% Survivor	11	0	0	1	0	12	12
20 Year C & L	0	0	0	0	6	6	0
10 Year C & L	0	0	0	0	0	0	0
5 Year C & L	0	0	0	0	0	0	0
20 Year Certain	0	0	0	0	0	0	0
Total	56	11	1	14	8	90	82
Age	Normal	Early	Disability	Service*	Beneficiary**	Total	Total***
Under 50	0	0	0	0	5	5	0
50 - 54	0	1	0	0	0	1	1
55 - 59	6	1	1	5	0	13	13
60 - 64	15	4	0	7	2	28	26
65 - 69	24	2	0	1	1	28	27
70 - 74	9	3	0	1	0	13	13
75 and Over	2	0	0	0	0	2	2
Total	56	11	1	14	8	90	82

	Previous Valuation	Current Valuation	Change
Average Age	62.4	63.8	1.3
Average Monthly Benefit	\$1,525	\$1,700	\$175
Total Members in Pay Status	79	90	11

* Includes Rule of 85, Rule of 88 and Rule of 90.

** Includes alternate payees.

*** Total excluding beneficiaries.

Schedule of Members in Pay Status as of July 1, 2017

Law Enforcement without prior Main System Service

Monthly Amount	Normal	Early	Disability	Service*	Beneficiary**	Total	Total***
Under \$200	1	0	0	0	0	1	1
\$200 - \$400	1	0	0	0	0	1	1
\$400 - \$600	1	0	0	0	0	1	1
\$600 - \$800	0	0	0	0	0	0	0
\$800 - \$1,000	0	0	1	0	0	1	1
\$1,000 - \$1,200	0	0	0	0	0	0	0
\$1,200 - \$1,400	1	0	0	0	0	1	1
\$1,400 - \$1,600	0	0	0	0	0	0	0
\$1,600 - \$1,800	0	0	0	0	0	0	0
\$1,800 - \$2,000	0	0	0	0	0	0	0
\$2,000 - \$2,200	0	0	0	0	0	0	0
\$2,200 - \$2,400	0	0	0	0	0	0	0
\$2,400 - \$2,600	0	0	0	0	0	0	0
\$2,600 - \$2,800	0	0	0	0	0	0	0
\$2,800 - \$3,000	0	0	0	0	0	0	0
\$3,000 and Over	1	0	0	0	0	1	1
Total	5	0	1	0	0	6	6
Payment Option	Normal	Early	Disability	Service*	Beneficiary**	Total	Total***
Life	1	0	1	0	0	2	2
Level Social Security Payment	0	0	0	0	0	0	0
Joint & 100% Survivor	2	0	0	0	0	2	2
Joint & 50% Survivor	2	0	0	0	0	2	2
10 Year C & L	0	0	0	0	0	0	0
5 Year C & L	0	0	0	0	0	0	0
Total	5	0	1	0	0	6	6
Age	Normal	Early	Disability	Service*	Beneficiary**	Total	Total***
Under 50	0	0	1	0	0	1	1
50 - 54	0	0	0	0	0	0	0
55 - 59	0	0	0	0	0	0	0
60 - 64	4	0	0	0	0	4	4
65 - 69	1	0	0	0	0	1	1
70 - 74	0	0	0	0	0	0	0
75 and Over	0	0	0	0	0	0	0
Total	5	0	1	0	0	6	6

	Previous Valuation	Current Valuation	Change
Average Age	48.4	59.2	10.8
Average Monthly Benefit	\$544	\$981	\$437
Total Members in Pay Status	2	6	4

* Includes Rule of 85, Rule of 88 and Rule of 90.

** Includes alternate payees.

*** Total excluding beneficiaries.

Schedule of New Pensions Awarded During the Year as of July 1, 2017

Main System, Judges, Law Enforcement

Monthly Amount	Normal	Early	Disability	Service*	Beneficiary**	Total	Total***
Under \$200	63	13	0	0	14	90	76
\$200 - \$400	51	32	0	0	19	102	83
\$400 - \$600	51	28	2	0	7	88	81
\$600 - \$800	45	26	8	2	10	91	81
\$800 - \$1,000	40	12	2	0	4	58	54
\$1,000 - \$1,200	34	12	2	0	8	56	48
\$1,200 - \$1,400	26	2	0	1	4	33	29
\$1,400 - \$1,600	28	4	0	0	0	32	32
\$1,600 - \$1,800	36	1	0	2	5	44	39
\$1,800 - \$2,000	36	2	0	2	4	44	40
\$2,000 - \$2,200	28	0	0	2	3	33	30
\$2,200 - \$2,400	26	0	0	0	3	29	26
\$2,400 - \$2,600	16	1	0	1	2	20	18
\$2,600 - \$2,800	27	0	0	0	1	28	27
\$2,800 - \$3,000	14	0	0	0	0	14	14
\$3,000 and Over	123	0	1	14	4	142	138
Total	644	133	15	24	88	904	816
Payment Option	Normal	Early	Disability	Service*	Beneficiary**	Total	Total***
Life	329	89	10	10	11	449	438
Life 1% Graduated Benefits	0	0	0	0	0	0	0
Life 2% Graduated Benefits	0	0	0	0	0	0	0
Level Social Security Payment	0	0	0	0	0	0	0
Joint & 100% Survivor	213	29	1	10	45	298	253
Joint & 100% Survivor 1% Graduated Benefits	0	0	0	0	0	0	0
Joint & 100% Survivor 2% Graduated Benefits	0	0	0	0	0	0	0
Joint & 50% Survivor	90	11	4	3	25	133	108
Joint & 50% Survivor 1% Graduated Benefits	0	0	0	0	0	0	0
Joint & 50% Survivor 2% Graduated Benefits	0	0	0	0	0	0	0
20 Year C & L	10	1	0	0	2	13	11
10 Year C & L	2	3	0	1	5	11	6
10 Year C & L 1% Graduated Benefits	0	0	0	0	0	0	0
5 Year C & L	0	0	0	0	0	0	0
5 Year Certain	0	0	0	0	0	0	0
10 Year Certain	0	0	0	0	0	0	0
10 Year Certain 1% Graduated Benefits	0	0	0	0	0	0	0
20 Year Certain	0	0	0	0	0	0	0
Total	644	133	15	24	88	904	816
Age	Normal	Early	Disability	Service*	Beneficiary**	Total	Total***
Under 50	0	0	3	1	2	6	4
50 - 54	0	0	2	11	5	18	13
55 - 59	60	21	5	11	9	106	97
60 - 64	175	96	5	0	15	291	276
65 - 69	331	16	0	1	11	359	348
70 - 74	60	0	0	0	20	80	60
75 and Over	18	0	0	0	26	44	18
Total	644	133	15	24	88	904	816

	Previous Valuation	Current Valuation	Change
New Pensions Awarded	760	904	144
Average Age	63.2	66.3	3.0
Average Monthly Benefit	\$1,760	\$1,531	(\$228)

* Includes Rule of 85, Rule of 88 and Rule of 90.

** Includes alternate payees.

*** Total excluding beneficiaries.

Schedule of Average Benefit Payments as of July 1, 2017

Main System		Years of Vesting Service						Total
		<10	10-14	15-19	20-24	25-29	>=30	
2013	Number of Retirees	1,611	1,258	1,146	1,136	1,174	1,519	7,844
	Average Monthly Benefit	\$242	\$423	\$626	\$1,031	\$1,503	\$2,270	\$1,023
	Average Years of Service	6.10	12.32	17.35	22.50	27.26	35.01	19.88
2014	Number of Retirees	1,760	1,330	1,193	1,191	1,252	1,662	8,388
	Average Monthly Benefit	\$248	\$440	\$647	\$1,068	\$1,547	\$2,345	\$1,061
	Average Years of Service	6.07	12.32	17.33	22.53	27.25	35.07	19.91
2015	Number of Retirees	1,957	1,418	1,231	1,273	1,352	1,863	9,094
	Average Monthly Benefit	\$290	\$462	\$674	\$1,123	\$1,616	\$2,462	\$1,128
	Average Years of Service	5.90	12.32	17.30	22.55	27.27	35.08	19.93
2016	Number of Retirees	1,848	1,471	1,268	1,336	1,470	2,095	9,488
	Average Monthly Benefit	\$255	\$469	\$684	\$1,151	\$1,613	\$2,432	\$1,163
	Average Years of Service	6.25	12.33	17.29	22.57	27.27	35.17	20.61
2017	Number of Retirees	1,940	1,529	1,324	1,395	1,557	2,252	9,997
	Average Monthly Benefit	\$260	\$484	\$714	\$1,184	\$1,657	\$2,507	\$1,207
	Average Years of Service	6.26	12.33	17.28	22.57	27.29	35.33	20.75
Judges		<10	10-14	15-19	20-24	25-29	>=30	Total
2013	Number of Retirees	1	5	8	4	7	2	27
	Average Monthly Benefit	\$1,057	\$2,445	\$4,124	\$4,740	\$4,404	\$3,740	\$3,835
	Average Years of Service	3.33	11.92	17.54	24.04	26.56	30.79	20.26
2014	Number of Retirees	1	5	8	5	7	3	29
	Average Monthly Benefit	\$1,057	\$2,445	\$4,124	\$5,303	\$4,404	\$5,258	\$4,117
	Average Years of Service	3.33	11.92	17.54	23.78	26.56	31.86	20.82
2015	Number of Retirees	1	6	8	5	9	4	33
	Average Monthly Benefit	\$1,057	\$2,817	\$4,288	\$5,303	\$5,097	\$5,887	\$4,491
	Average Years of Service	3.33	12.25	17.73	23.78	26.82	32.27	21.46
2016	Number of Retirees	1	6	8	5	9	4	33
	Average Monthly Benefit	\$1,057	\$2,817	\$4,288	\$5,303	\$5,097	\$5,887	\$4,491
	Average Years of Service	3.33	12.25	17.73	23.78	26.82	32.27	21.46
2017	Number of Retirees	3	3	5	10	8	8	37
	Average Monthly Benefit	\$2,467	\$2,773	\$3,545	\$5,380	\$4,598	\$6,644	\$4,789
	Average Years of Service	6.92	11.58	17.62	23.07	26.92	36.77	23.89

Includes retired and disabled members.

Values prior to July 1, 2016, were calculated by the prior actuary.

Schedule of Average Benefit Payments as of July 1, 2017

Law Enforcement with Main Service		Years of Vesting Service						Total
		<10	10-14	15-19	20-24	25-29	>=30	
2013	Number of Retirees	6	5	3	9	12	10	45
	Average Monthly Benefit	\$500	\$939	\$1,161	\$1,307	\$1,997	\$3,129	\$1,738
	Average Years of Service	7.10	12.70	18.94	21.57	27.10	33.00	22.49
2014	Number of Retirees	6	5	3	10	12	10	46
	Average Monthly Benefit	\$500	\$939	\$1,161	\$1,437	\$1,960	\$3,129	\$1,747
	Average Years of Service	7.10	12.70	18.64	21.64	27.18	33.00	22.55
2015	Number of Retirees	10	9	5	13	15	13	65
	Average Monthly Benefit	\$981	\$865	\$1,158	\$1,554	\$1,958	\$3,141	\$1,751
	Average Years of Service	5.10	12.45	18.56	21.94	27.12	32.78	21.14
2016	Number of Retirees	10	10	6	16	15	14	71
	Average Monthly Benefit	\$455	\$795	\$1,239	\$1,635	\$1,958	\$2,992	\$1,653
	Average Years of Service	5.84	12.63	18.43	22.08	27.12	32.89	21.35
2017	Number of Retirees	12	11	7	17	17	18	82
	Average Monthly Benefit	\$528	\$790	\$1,291	\$1,770	\$2,180	\$3,261	\$1,828
	Average Years of Service	6.22	12.58	18.13	22.09	27.38	33.03	21.65
Law Enforcement without Main Service								
Service		<10	10-14	15-19	20-24	25-29	>=30	Total
2013	Number of Retirees	1	0	0	0	0	0	1
	Average Monthly Benefit	\$816	\$0	\$0	\$0	\$0	\$0	\$816
	Average Years of Service	0.58	0.00	0.00	0.00	0.00	0.00	0.58
2014	Number of Retirees	1	0	0	0	0	0	1
	Average Monthly Benefit	\$816	\$0	\$0	\$0	\$0	\$0	\$816
	Average Years of Service	0.58	0.00	0.00	0.00	0.00	0.00	0.58
2015	Number of Retirees	1	0	0	0	0	0	1
	Average Monthly Benefit	\$816	\$0	\$0	\$0	\$0	\$0	\$816
	Average Years of Service	0.58	0.00	0.00	0.00	0.00	0.00	0.58
2016	Number of Retirees	2	0	0	0	0	0	2
	Average Monthly Benefit	\$544	\$0	\$0	\$0	\$0	\$0	\$544
	Average Years of Service	2.29	0.00	0.00	0.00	0.00	0.00	2.29
2017	Number of Retirees	4	1	0	0	1	0	6
	Average Monthly Benefit	\$390	\$1,204	\$0	\$0	\$3,126	\$0	\$981
	Average Years of Service	4.12	12.58	0.00	0.00	26.17	0.00	9.21

Includes retired and disabled members.

Values prior to July 1, 2016, were calculated by the prior actuary.

Schedule of Retirees and Beneficiaries Added to and Removed from the Rolls

Main System

Plan Year	Beg of Year		Added to Rolls		Removed from Rolls		End of Year Balance		Average Annual Benefit	% Increase in Annual Benefit
	No.	Ann. Benefits*	No.	Ann. Benefits*	No.	Ann. Benefits*	No.**	Ann. Benefits*		
Retirement										
2008	6,506	\$ 61.7	547	\$ 7.2	(240)	\$ (1.7)	6,813	\$ 67.2	\$ 9,869	8.9%
2009	6,813	67.2	567	7.1	(222)	(1.9)	7,158	72.4	10,120	7.7%
2010	7,158	72.4	468	6.5	(254)	(1.9)	7,372	77.0	10,451	6.4%
2011	7,372	77.0	618	9.4	(230)	(1.8)	7,760	84.6	10,904	9.9%
2012	7,760	84.6	698	12.5	(216)	(1.8)	8,242	95.3	11,566	12.6%
2013	8,242	95.3	708	10.9	(284)	(4.0)	8,666	102.2	11,798	7.2%
2014	8,666	102.2	855	13.2	(291)	(2.4)	9,230	113.0	12,243	10.6%
2015	9,230	113.0	992	19.3	(243)	(2.4)	9,979	129.9	13,017	15.0%
2016	9,979	129.9	703	12.3	(288)	(2.6)	10,394	139.6	13,435	7.5%
2017	10,394	139.6	870	16.1	(307)	(3.0)	10,957	152.8	13,943	9.4%

*\$ in millions

** Excludes 24 pensioners as of June 30, 2014, 28 pensioners as of June 30, 2015, 35 pensioners as of June 30, 2016, and 41 pensioners as of June 30, 2017 in suspended status.

Judges

Plan Year	Beg of Year		Added to Rolls		Removed from Rolls		End of Year Balance		Average Annual Benefit	% Increase in Annual Benefit
	No.	Ann. Benefits	No.	Ann. Benefits	No.	Ann. Benefits	No.	Ann. Benefits		
Retirement										
2008	30	\$ 1,077,497	1	\$ 49,517	(1)	(\$33,795)	30	\$ 1,093,219	\$ 36,441	1.5%
2009	30	1,093,219	1	69,931	(3)	(92,038)	28	1,071,112	38,254	-2.0%
2010	28	1,071,112	4	194,159	(2)	(47,106)	30	1,218,165	40,605	13.7%
2011	30	1,218,165	5	273,928	(1)	(20,861)	34	1,471,232	43,272	20.8%
2012	34	1,471,232	0	0	0	(648)	34	1,470,584	43,252	0.0%
2013	34	1,470,584	2	60,181	0	0	36	1,530,765	42,521	4.1%
2014	36	1,530,765	2	190,156	0	0	38	1,720,921	45,287	12.4%
2015	38	1,720,921	6	462,888	0	0	44	2,183,809	49,632	26.9%
2016	44	2,183,809	2	85,597	(3)	(147,638)	43	2,121,768	49,343	-2.8%
2017	43	2,121,768	10	674,619	(3)	(156,433)	50	2,639,954	52,799	24.4%

Values prior to July 1, 2016, were calculated by the prior actuary.

Schedule of Retirees and Beneficiaries Added to and Removed from the Rolls

Law Enforcement with prior Main System Service

Plan Year	Beg of Year		Added to Rolls		Removed from Rolls		End of Year Balance		Average Annual Benefit	% Increase in Annual Benefit
	No.	Ann. Benefits	No.	Ann. Benefits	No.	Ann. Benefits	No.	Ann. Benefits		
Retirement										
2008	15	\$ 213,045	6	\$ 122,584	0	\$ 0	21	\$ 335,688	\$ 15,985	57.6%
2009	21	335,688	4	78,938	(1)	(23,246)	24	391,380	16,307	16.6%
2010	24	391,380	10	176,285	(2)	(26,749)	32	540,916	16,904	38.2%
2011	32	540,916	9	217,899	0	0	41	758,815	18,508	40.3%
2012	41	758,815	6	105,606	0	0	47	864,421	18,392	13.9%
2013	47	864,421	9	225,057	0	(13,776)	56	1,075,702	19,209	24.4%
2014	56	1,075,702	7	83,168	(1)	(57,253)	62	1,101,617	17,768	2.4%
2015	62	1,101,617	11	301,041	0	0	73	1,402,658	19,215	27.3%
2016	73	1,402,658	7	53,522	(1)	(10,529)	79	1,445,651	18,299	3.1%
2017	79	1,445,651	11	390,805	0	0	90	1,836,456	20,405	27.0%

Law Enforcement without prior Main System Service

Plan Year	Beg of Year		Added to Rolls		Removed from Rolls		End of Year Balance		Average Annual Benefit	% Increase in Annual Benefit
	No.	Ann. Benefits	No.	Ann. Benefits	No.	Ann. Benefits	No.	Ann. Benefits		
Retirement										
2008	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	\$ 0	NA
2009	0	0	0	0	0	0	0	0	0	NA
2010	0	0	0	0	0	0	0	0	0	NA
2011	0	0	0	0	0	0	0	0	0	NA
2012	0	0	0	0	0	0	0	0	0	NA
2013	0	0	1	9,792	0	0	1	9,792	9,792	100.0%
2014	1	9,792	0	0	0	0	1	9,792	9,792	0.0%
2015	1	9,792	0	0	0	0	1	9,792	9,792	0.0%
2016	1	9,792	1	3,264	0	0	2	13,056	6,528	33.3%
2017	2	13,056	4	57,609	0	0	6	70,665	11,778	441.2%

Values prior to July 1, 2016, were calculated by the prior actuary.

SECTION D

GASB STATEMENT 67 SCHEDULES

Discussion

Accounting Standard

For pension plans that are administered through trusts or equivalent arrangements, Governmental Accounting Standards Board (GASB) Statement No. 67 establishes standards of financial reporting for separately issued financial reports and specifies the required approach for measuring the pension liability. Similarly, GASB Statement No. 68 establishes standards for state and local government employers (as well as non-employer contributing entities) to account for and disclose the net pension liability, pension expense and other information associated with providing retirement benefits to their employees (and former employees) on their basic financial statements.

The following discussion provides a summary of the information that is required to be disclosed under these accounting standards. A number of these disclosure items are provided in this report. However, certain non-actuarial information, such as notes regarding accounting policies and investments, is not included in this report and the retirement system and/or plan sponsor will be responsible for preparing and disclosing that information to comply with these accounting standards.

Financial Statements

Pension plans that prepare their own, stand-alone financial statements are required to present two financial statements – a statement of fiduciary net position and a statement of changes in fiduciary net position in accordance with GASB Statement No. 67. The *statement of fiduciary net position* presents the assets and liabilities of the pension plan at the end of the pension plan's reporting period. The *statement of changes in fiduciary net position* presents the additions, such as contributions and investment income, and deductions, such as benefit payments and expenses, and net increase or decrease in the fiduciary net position.

Notes to Financial Statements

GASB Statement No. 68 requires the notes of the employer's financial statements to disclose the total pension expense, the pension plan's liabilities and assets, and deferred outflows and inflows of resources related to pensions.

GASB Statement Nos. 67 and 68 require the notes of the financial statements for the employers and pension plans to include certain additional information. The list of disclosure items should include:

- A description of benefits provided by the plan;
- The type of employees and number of members covered by the pension plan;
- A description of the plan's funding policy, which includes member and employer contribution requirements;
- The pension plan's investment policies;
- The pension plan's fiduciary net position, net pension liability and the pension plan's fiduciary net position as a percentage of the total pension liability;
- The net pension liability using a discount rate that is 1% higher and 1% lower than used to calculate the total pension liability and net pension liability for financial reporting purposes;
- Significant assumptions and methods used to calculate the total pension liability;
- Inputs to the discount rates; and
- Certain information about mortality assumptions and the dates of experience studies.

GASB Statement No. 67 (Continued)

Retirement systems that issue stand-alone financial statements are required to disclose additional information in accordance with GASB Statement No. 67. This information includes:

- The composition of the pension plan's board and the authority under which benefit terms may be amended;
- A description of how fair value is determined;
- Information regarding certain reserves and investments, which include concentrations of investments greater than or equal to 5%, receivables and insurance contracts excluded from plan assets; and
- Annual money-weighted rate of return.

Required Supplementary Information

GASB Statement No. 67 requires a 10-year fiscal history of:

- Sources of changes in the net pension liability;
- Information about the components of the net pension liability and related ratios, including the pension plan's fiduciary net position as a percentage of the total pension liability, and the net pension liability as a percent of covered-employee payroll; and
- A comparison of the actual employer contributions to the actuarially determined contributions based on the plan's funding policy.

Timing of the Actuarial Valuation

An actuarial valuation to determine the total pension liability is required to be performed at least every two years. The net pension liability and pension expense should be measured as of the pension plan's fiscal year end (measurement date) on a date that is within the employer's prior fiscal year. If the actuarial valuation used to determine the total pension liability is not calculated as of the measurement date, the total pension liability is required to be rolled forward from the actuarial valuation date to the measurement date.

The total pension liability shown in this report is based on an actuarial valuation performed as of June 30, 2017, and a measurement date of June 30, 2017.

Single Discount Rate

Projected benefit payments are required to be discounted to their actuarial present values using a Single Discount Rate that reflects (1) a long-term expected rate of return on pension plan investments (to the extent that the plan's fiduciary net position is projected to be sufficient to pay benefits) and (2) a tax-exempt municipal bond rate based on an index of 20-year mixed maturity general obligation bonds with an average Standard & Poor's Corp.'s AA credit rating (which is published by Fidelity) as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

GASB Statement No. 67 (Continued)

For the purpose of this valuation, the expected rate of return on pension plan investments is 7.75%; the municipal bond rate is 3.56% (based on the most recent date available on or before the measurement date of the "20-year Municipal GO Index" from Fidelity); and the resulting Single Discount Rate is 6.44%.

Effective Date and Transition

GASB Statement Nos. 67 and 68 are effective for fiscal years beginning after June 15, 2013, and June 15, 2014, respectively.

GASB Statement No. 67 (Continued)

Executive Summary as of June 30, 2017

	Main System	Judges	Law Enforcement with Prior Main Service	Law Enforcement without Prior Main Service	Total
Actuarial Valuation Date	07/01/2017	07/01/2017	07/01/2017	07/01/2017	07/01/2017
Measurement Date of the Net Pension Liability	07/01/2017	07/01/2017	07/01/2017	07/01/2017	07/01/2017
Plan's Fiscal Year Ending Date (Reporting Date) for GASB 67	06/30/2017	06/30/2017	06/30/2017	06/30/2017	06/30/2017
Membership					
Number of					
- Retirees and Beneficiaries	10,957	50	90	6	11,103
- Inactive, Nonretired Members	11,336	4	229	85	11,654
- Active Members	22,574	54	498	117	23,243
- Total	44,867	108	817	208	46,000
Covered Payroll	\$ 1,020,843,253	\$ 7,866,090	\$ 28,765,678	\$ 5,896,777	\$ 1,063,371,798
Net Pension Liability					
Total Pension Liability	\$ 4,227,873,933	\$ 45,789,468	\$ 73,040,417	\$ 7,667,872	\$ 4,354,371,690
Plan Fiduciary Net Position	2,620,545,753	49,576,578	51,024,228	6,689,031	2,727,835,589
Net Pension Liability	\$ 1,607,328,180	\$ (3,787,110)	\$ 22,016,189	\$ 978,841	\$ 1,626,536,101
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	61.98 %	108.27 %	69.86 %	87.23 %	62.65 %
Net Pension Liability as a Percentage of Covered Payroll	157.45 %	(48.14)%	76.54 %	16.60 %	152.96 %
Development of the Single Discount Rate					
Single Discount Rate	6.44 %	6.44 %	6.44 %	6.44 %	6.44 %
Long-Term Expected Rate of Investment Return	7.75 %	7.75 %	7.75 %	7.75 %	7.75 %
Long-Term Municipal Bond Rate*	3.56 %	3.56 %	3.56 %	3.56 %	3.56 %
Last year ending June 30 in the 2017 to 2116 projection period for which projected benefit payments are fully funded	2061	2061	2061	2061	2061

*Source: Fixed-income municipal bonds with 20 years to maturity that include only federally tax-exempt municipal bonds as reported in Fidelity Index's "20-Year Municipal GO AA Index" as of June 30, 2017. In describing this index, Fidelity notes that the municipal curves are constructed using option-adjusted analytics of a diverse population of over 10,000 tax exempt securities.

GASB Statement No. 67 (Continued)

Schedules of Required Supplementary Information Schedule of Net Pension Liability and Related Ratios Multiyear

Last 10 Fiscal Years (which may be built prospectively)

FY Ending 30-Jun	System	Total Pension Liability ¹	Plan Net Position	Net Pension Liability	Plan Net Position as a % of Total Pension Liability	Covered Payroll ²	Net Pension Liability as a % of Covered Payroll
2014	Main	\$ 2,846,579,777	\$ 2,211,858,402	\$ 634,721,375	77.70 %	\$ 865,868,265	73.30 %
2014	Judges	38,989,792	42,713,635	(3,723,843)	109.55 %	6,598,981	(56.43)%
2014	Law Enforcement with prior Main System service	30,791,599	24,806,508	5,985,091	80.56 %	13,394,927	44.68 %
2014	Law Enforcement without prior Main System service	2,190,975	2,204,318	(13,343)	100.61 %	2,589,887	(0.52)%
2014	Total PERS	2,918,552,143	2,281,582,863	636,969,280	78.18 %	888,452,060	71.69 %
2015	Main	\$ 2,976,071,808	\$ 2,296,088,880	\$ 679,982,928	77.15 %	\$ 946,197,522	71.86 %
2015	Judges	39,381,443	44,137,412	(4,755,969)	112.08 %	6,964,502	(68.29)%
2015	Law Enforcement with prior Main System service	34,317,782	28,691,976	5,625,806	83.61 %	16,732,974	33.62 %
2015	Law Enforcement without prior Main System service	2,675,506	2,792,541	(117,035)	104.37 %	3,641,404	(3.21)%
2015	Total PERS	3,052,446,539	2,371,710,809	680,735,730	77.70 %	973,536,402	69.92 %
2016	Main	\$ 3,299,381,100	\$ 2,324,783,623	\$ 974,597,477	70.46 %	\$ 1,007,764,043	96.71 %
2016	Judges	39,819,443	44,269,616	(4,450,173)	111.18 %	7,937,062	(56.07)%
2016	Law Enforcement with prior Main System service	53,865,148	42,406,694	11,458,454	78.73 %	28,225,868	40.60 %
2016	Law Enforcement without prior Main System service	3,499,776	3,435,724	64,052	98.17 %	4,621,494	1.39 %
2016	Total PERS	3,396,565,467	2,414,895,657	981,669,810	71.10 %	1,048,548,467	93.62 %
2017	Main	\$ 4,227,873,933	\$ 2,620,545,753	\$ 1,607,328,180	61.98 %	\$ 1,020,843,253	157.45 %
2017	Judges	45,789,468	49,576,578	(3,787,110)	108.27 %	7,866,090	(48.14)%
2017	Law Enforcement with prior Main System service	73,040,417	51,024,228	22,016,189	69.86 %	28,765,678	76.54 %
2017	Law Enforcement without prior Main System service	7,667,872	6,689,031	978,841	87.23 %	5,896,777	16.60 %
2017	Total PERS	4,354,371,690	2,727,835,589	1,626,536,101	62.65 %	1,063,371,798	152.96 %

¹The total pension liability is based on a single discount rate of 8.00% for fiscal years prior to 2017, and 6.44% for fiscal year 2017.

²Prior to the valuation as of July 1, 2016, annual payroll is based on projected annual compensation for the upcoming year. Beginning with the valuation as of July 1, 2016, annual payroll and average annual pay are based on annualized payroll as of the valuation date.

Values prior to July 1, 2016, were calculated by the prior actuary.

GASB Statement No. 67 (Continued)

Schedule of Changes in Net Pension Liability and Related Ratios Current Report Period Fiscal Year Ended June 30, 2017

Fiscal Year Ending June 30, 2017	Law Enforcement				
	Main System	Judges	with Prior Main System Service	without Prior Main System Service	Total PERS
Total pension liability					
Service cost	\$ 107,826,127	\$ 1,506,688	\$ 3,224,989	\$ 590,575	\$ 113,148,379
Interest on the total pension liability	261,960,798	3,147,570	4,360,954	300,528	269,769,850
Changes of benefit terms	0	0	0	0	0
Difference between expected and actual experience ¹	(812,730)	(2,410,397)	(357,125)	(31,768)	(3,612,020)
Changes of assumptions ²	718,062,723	6,201,124	13,852,521	3,375,614	741,491,982
Benefit payments and refunds	(158,544,085)	(2,474,960)	(1,906,070)	(66,853)	(162,991,968)
Net change in total pension liability	928,492,833	5,970,025	19,175,269	4,168,096	957,806,223
Total pension liability - beginning³	3,299,381,100	39,819,443	53,865,148	3,499,776	3,396,565,467
Total pension liability - ending (a)³	<u>\$ 4,227,873,933</u>	<u>\$ 45,789,468</u>	<u>\$ 73,040,417</u>	<u>\$ 7,667,872</u>	<u>\$ 4,354,371,690</u>
Plan fiduciary net position					
Contributions - Employer	\$ 74,023,555	\$ 1,407,326	\$ 3,005,338	\$ 497,352	\$ 78,933,571
Contributions - Employee	73,287,125	642,611	1,698,637	379,083	76,007,456
Contributions - Service credit repurchases	9,784,908	0	156,309	1,863,853	11,805,070
Pension plan net investment income	299,507,510	5,743,052	5,702,555	589,548	311,542,664
Benefit payments and refunds	(158,544,085)	(2,474,960)	(1,906,070)	(66,853)	(162,991,968)
Pension plan administrative expense	(2,547,265)	(11,067)	(39,235)	(9,676)	(2,607,243)
Transfers and Other Income	250,382	-	-	-	250,382
Net change in plan fiduciary net position	295,762,130	5,306,962	8,617,534	3,253,307	312,939,932
Plan fiduciary net position - beginning	2,324,783,623	44,269,616	42,406,694	3,435,724	2,414,895,657
Plan fiduciary net position - ending (b)	<u>\$ 2,620,545,753</u>	<u>\$ 49,576,578</u>	<u>\$ 51,024,228</u>	<u>\$ 6,689,031</u>	<u>\$ 2,727,835,589</u>
Net pension liability - ending (a) - (b)	<u>\$ 1,607,328,180</u>	<u>\$ (3,787,110)</u>	<u>\$ 22,016,189</u>	<u>\$ 978,841</u>	<u>\$ 1,626,536,101</u>
Plan fiduciary net position as a percentage of total pension liability	61.98 %	108.27 %	69.86 %	87.23 %	62.65 %
Covered-employee payroll	\$ 1,020,843,253	\$ 7,866,090	\$ 28,765,678	\$ 5,896,777	\$ 1,063,371,798
Net pension liability as a percentage of covered-employee payroll	157.45 %	(48.14)%	76.54 %	16.60 %	152.96 %

¹ Includes liability attributable to transfer of members.

² Includes difference in liability due to changes in the single discount rate assumption and inflation assumption.

³ The total pension liability is based on a single discount rate of 8.00% for the beginning of the fiscal year and 6.44% for the end of the fiscal year.

GASB Statement No. 67 (Continued)

Sensitivity of Net Pension Liability to the Single Discount Rate Assumption

The following presents the net pension liability/(asset) of the PERS, calculated using the current discount rate of 6.44%, as well as what the PERS' net pension liability/(asset) would be if it were calculated using a discount rate that is 1-percentage point lower (5.44%) or is 1-percentage point higher (7.44%) than the current rate.

System	1% Decrease	Current Single Discount Rate Assumption	1% Increase
	5.44%	6.44%	7.44%
Main System	\$2,181,997,191	\$1,607,328,180	\$1,129,227,525
Judges	775,578	(3,787,110)	(7,708,973)
Law Enforcement			
With Main System Service	33,130,374	22,016,189	12,973,648
Without Main System Service	2,259,689	978,841	(10,395)
Total PERS	2,218,162,831	1,626,536,101	1,134,481,805

GASB Statement No. 67 (Continued)

System Asset Allocation

<u>Asset Class</u>	<u>Target Allocation</u>	<u>Long-Term Expected Real Rate of Return</u>	<u>Allocation-Weighted Long-Term Expected Real Rate of Return</u>
Domestic Equities	31.00 %	6.05 %	1.88 %
International Equities	21.00 %	6.70 %	1.41 %
Private Equity	5.00 %	10.20 %	0.51 %
Domestic Fixed Income	17.00 %	1.43 %	0.24 %
Int'l Fixed Income-Developed Investment Grade	5.00 %	(0.45)%	(0.02)%
Global Real Assets	20.00 %	5.16 %	1.03 %
Cash Equivalents	1.00 %	0.00 %	0.00 %
Total	100.00 %		5.05 %

Expected return by asset class and target allocation provided by investment consultant.

The discount rate used to measure the total pension liability was 6.44%. The projection of cash flows used to determine the discount rate assumed plan member and statutory/Board approved employer contributions will be made at rates equal to those based on the July 1, 2017, and July 1, 2016, PERS actuarial valuation reports. For this purpose, only employer contributions that are intended to fund benefits of current plan members and their beneficiaries are included. Projected employer contributions that are intended to fund the service costs of future plan members and their beneficiaries are not included. Based on those assumptions, the pension plan's fiduciary net position was projected to be sufficient to make all projected future benefit payments through the year of 2061. Therefore, the long-term expected rate of return on pension plan investments was applied to projected benefit payments through the year 2061, and the municipal bond rate was applied to all benefit payments after that date.

GASB Statement No. 67 (Continued)

Schedule of Contributions Multiyear

FY Ending 30-Jun	System	Actuarially Determined Contribution ¹	Actual Contribution	Contribution Deficiency (Excess)	Covered Payroll ²	Actual Contribution as a % of Covered Payroll
2014	Main	\$ 105,092,504	\$ 58,872,974	\$ 46,219,530	\$ 865,868,265	6.80%
2014	Judges	1,099,249	1,159,604	(60,355)	6,598,981	17.57%
2014	Law Enforcement with prior Main System service	1,449,458	1,385,958	63,500	13,394,927	10.35%
2014	Law Enforcement without prior Main System service	210,115	242,514	(32,399)	2,589,887	9.36%
2014	Total PERS	107,851,326	61,661,050	46,190,276	888,452,060	6.94%
2015	Main	\$ 104,636,238	\$ 67,669,374	\$ 36,966,864	\$ 946,197,522	7.15%
2015	Judges	1,030,705	1,225,358	(194,653)	6,964,502	17.59%
2015	Law Enforcement with prior Main System service	1,577,004	1,638,384	(61,380)	16,732,974	9.79%
2015	Law Enforcement without prior Main System service	270,026	309,419	(39,393)	3,641,404	8.50%
2015	Total PERS	107,513,973	70,842,535	36,671,438	973,536,402	7.28%
2016	Main	\$ 121,358,455	\$ 72,960,487	\$ 48,397,968	\$ 1,007,764,043	7.24%
2016	Judges	781,713	1,364,327	(582,614)	7,937,062	17.19%
2016	Law Enforcement with prior Main System service	1,828,196	2,384,097	(555,901)	28,225,868	8.45%
2016	Law Enforcement without prior Main System service	367,803	371,664	(3,861)	4,621,494	8.04%
2016	Total PERS	124,336,167	77,080,576	47,255,591	1,048,548,467	7.35%
2017	Main	\$ 112,981,892	\$ 74,023,555	\$ 38,958,337	\$ 1,020,843,253	7.25%
2017	Judges	734,399	1,407,326	(672,927)	7,866,090	17.89%
2017	Law Enforcement with prior Main System service	2,514,672	3,005,338	(490,666)	28,765,678	10.45%
2017	Law Enforcement without prior Main System service	333,237	497,352	(164,115)	5,896,777	8.43%
2017	Total PERS	116,564,200	78,933,571	37,630,629	1,063,371,798	7.42%

¹ The actuarially determined contribution was based on an investment return assumption of 8.00% and a payroll growth assumption of 4.50% (4.00% for Judges) for fiscal years ending 2014 through 2017.

² Prior to the valuation as of July 1, 2016, annual payroll is based on projected annual compensation for the upcoming year. Beginning with the valuation as of July 1, 2016, annual payroll and average annual pay are based on annualized payroll as of the valuation date.

Values prior to July 1, 2016, were calculated by the prior actuary.

GASB Statement No. 67 (Continued)

Valuation Date: July 1, 2017
Notes The actuarially determined contribution amount is calculated as of June 30, 12 months prior to the end of the fiscal year in which the contributions are reported.

Methods and Assumptions Used to Determine Actuarially Determined Contribution Rates:

Actuarial Cost Method Entry Age Normal
Amortization Method Level Percentage of Payroll, Open Period
Assumed annual payroll growth of 3.75% (3.25% for Judges) beginning with the fiscal year 2018 contribution, 4.50% (4.00% for Judges) for contributions prior to fiscal year 2018.
Remaining Amortization Period 20 years
Asset Valuation Method 5-Year smoothed market
Inflation 2.50 percent beginning with the fiscal year 2018 contribution, 3.50% for contributions prior to fiscal year 2018.
Salary Increases 4.00 percent to 20.00 percent including inflation
Investment Rate of Return 7.75% beginning with the fiscal year 2018 contribution, 8.00% for contributions prior to fiscal year 2018.
Retirement Age Age-based table of rates that are specific to the type of eligibility condition.
Mortality RP 2000 Combined Healthy Mortality table, sex-distinct, with rates set back 2 years for males and 3 years for females. RP 2000 Disabled Mortality table, sex-distinct, with rates set back 1 years for males (no setback for females), with rates multiplied by 125% for post-retirement disabled mortality. Mortality rates are projected from 2014 using the Social Security Administration (SSA) Intermediate Cost scale.

Other Information:

Notes There were no benefit changes during the year.
First effective with the actuarial valuation as of July 1, 2017, investment return assumption was lowered from 8.00 percent to 7.75 percent and price inflation rate was lowered from 3.00 percent to 2.50 percent. Annual payroll growth was lowered from 4.50 percent to 3.75 percent (4.00 percent to 3.25 percent for Judges). Asset smoothing method is updated to 5-year smoothed market. All other actuarial assumptions were first adopted by the Board and are based on an experience study covering the period July 1, 2009, through June 30, 2014.

The employer rates to the System are the statutory/Board approved contribution rates of 7.12% of payroll for the Main System, 17.52% for the Judges System, 9.81% for Law Enforcement with prior Main System service System, and 7.93% for Law Enforcement without prior Main System service System.

Methods and Assumptions Used to Determine GASB 67/68 Net Pension Liability:

Actuarial Cost Method Entry Age Normal
Asset Valuation Method Plan Fiduciary Net Position (Market value of assets, no asset smoothing)
Inflation 2.50 percent
Salary Increases 4.00 percent to 20.00 percent including inflation
Single Discount Rate 6.44% (Based on an investment return assumption of 7.75% and a municipal bond rate of 3.56%)
Retirement Age Age-based table of rates that are specific to the type of eligibility condition.
Mortality RP 2000 Combined Healthy Mortality table, sex-distinct, with rates set back 2 years for males and 3 years for females. RP 2000 Disabled Mortality table, sex-distinct, with rates set back 1 years for males (no setback for females), with rates multiplied by 125% for post-retirement disabled mortality. Mortality rates are projected from 2014 using the Social Security Administration (SSA) Intermediate Cost scale.

Other Information:

Notes There were no benefit changes during the year.
First effective with the actuarial valuation as of July 1, 2017, investment return assumption was lowered from 8.00 percent to 7.75 percent and price inflation rate was lowered from 3.00 percent to 2.50 percent. Annual payroll growth was lowered from 4.50 percent to 3.75 percent (4.00 percent to 3.25 percent for Judges). All other actuarial assumptions were adopted by the Board and are based on an experience study covering the period July 1, 2009, through June 30, 2014.

The employer rates to the System are the statutory/Board approved contribution rates of 7.12% of payroll for the Main System, 17.52% for the Judges System, 9.81% for Law Enforcement with prior Main System service System, and 7.93% for Law Enforcement without prior Main System service System.

SECTION E

ACTUARIAL VALUATION PROCEDURES

Actuarial Assumptions in the Actuarial Valuation Process

Normal cost and the allocation of benefit values between service rendered before and after the valuation date were determined using the **Individual Entry Age Normal** actuarial cost method having the following characteristics:

- The normal cost for each individual active member, payable from the date of employment to the date of retirement, is sufficient to accumulate the value of the member's benefit at the time of retirement; and
- Each annual normal cost is a constant percentage of the member's year by year projected covered pay.

Financing of Unfunded Actuarial Accrued Liabilities. The unfunded actuarial accrued liability is amortized using 20-year open level-percentage of pay amortization of the unfunded liability as of the valuation date for purposes of calculating the actuarial contribution rate.

Actuarial Value of Pension Plan Assets. The calculated value is determined by adjusting the market value of assets to reflect the investment gains and losses (the difference between the actual investment return and the expected investment return) during each of the last five years at the rate of 20 percent per year. This asset smoothing method was adopted by the Board for use beginning with the July, 1 2017, actuarial valuation. Net deferred asset gains attributable to fiscal years 2016 and prior were fully recognized as of July 1, 2017.

Actuarial Valuation Assumptions. The contribution and benefit values of the System are calculated by applying actuarial assumptions to the benefit provisions and census information furnished, using the actuarial cost method described above.

The principal areas of financial risk which require assumptions about future experiences are:

- Long-term rates of investment return to be generated by the assets of the Plan;
- Patterns of pay increases to members;
- Rates of mortality among members, retirees and beneficiaries;
- Rates of withdrawal of active members;
- Rates of disability among members; and
- The age patterns of actual retirement.

In an actuarial valuation, the monetary effect of each assumption is calculated for as long as a present covered person survives; a period of time which can be as long as a century.

Actual experience of the Plan will not coincide exactly with assumed experience. Each valuation provides a complete recalculation of assumed future experience and takes into account all past differences between assumed and actual experience. The result is a continual series of adjustments (usually small) to the computed contribution rate.

Actuarial Assumptions in the Actuarial Valuation Process (Continued)

From time-to-time it becomes appropriate to modify one or more of the assumptions, to reflect experience trends (but not random year-to-year fluctuations). Thus, an experience review of the North Dakota Public Employees Retirement System for the period July 1, 2009, to July 1, 2014, was performed by the prior actuary to compare the demographic and economic experience against the actuarial assumptions used in the valuations. Most of the actuarial assumptions described in this section were adopted by the Board for use beginning with the July 1, 2015, valuation.

Additional information regarding the rationale for the assumptions based on the **prior actuary's experience study** may be found in the 2015 experience review report. All actuarial assumptions are expectations of future experience, not current market measures.

Prior to the July 1, 2017, actuarial valuation, GRS performed an economic study to review the key economic actuarial assumptions and the asset valuation method. Additional information regarding the rationale for the assumptions based on the GRS economic study may be found in the report dated February 20, 2017.

Except where noted, most actuarial assumptions described in this section were adopted by the Board for use beginning with the July 1, 2015, valuation.

The assumptions were provided by, and are the responsibility of, the NDPERS Board. GRS was unable to judge the reasonableness of the assumptions and methods without performing a substantial amount of additional work beyond the scope of the assignment, and did not do so.

Actuarial Valuation Assumptions

Current Actuarial Valuation Assumptions and Methods

The assumed rate of investment return used was 7.75 percent, net of investment expenses, annually. This assumption was adopted by the Board for use beginning with the July 1, 2017, actuarial valuation.

The assumed rate of price inflation is 2.50 percent. This assumption was adopted by the Board for use beginning with the July 1, 2017, actuarial valuation.

No Cost of Living Adjustments (COLA) are provided to benefits recipients. Therefore, there is no COLA assumption for this valuation.

The rates of annual salary increase used for individual members are in accordance with the following table. This assumption is used to project a member’s current salary to the salaries upon which benefit amounts will be based.

Service At Beginning of Year	Main System			
	State Employee	Non-State Employee	Law Enforcement	Judges
0	12.00%	15.00%	20.00%	
1	9.50%	10.00%	20.00%	
2	7.25%	8.00%	20.00%	
3			10.00%	
4			10.00%	
Age*				
Under 30	7.25%	10.00%	7.25%	4.00%
30-39	6.50%	7.50%	6.50%	4.00%
40-49	6.25%	6.75%	6.25%	4.00%
50-59	5.75%	6.50%	5.75%	4.00%
60+	5.00%	5.25%	5.00%	4.00%

**Age-based salary increase rates apply for employees with three or more years of service in the Main System, five or more years of service in the Law Enforcement Systems and for all employees in the Judges System.*

The assumed rate of total payroll growth used in amortizing the unfunded liability as a level percentage of pay is:

Main System and Law Enforcement: 3.75 percent
Judges: 3.25 percent

This assumption was adopted by the Board for use beginning with the July 1, 2017 actuarial valuation.

Actuarial Valuation Assumptions (Continued)

The mortality assumptions are as follows:

	Male Setback	Female Setback
RP-2000 Combined Healthy Mortality Table (healthy mortality)	2 years	3 years
RP-2000 Disabled Retiree Mortality Table (disabled post retirement)*	1 year	0 years

**Rates multiplied by 125 percent.*

To provide a margin for future mortality improvements, generational mortality improvements from the year 2014 using the Social Security Administration (SSA) 2014 Intermediate Cost scale were assumed.

Following is a table with the life expectancies by age as of the valuation date.

Age	Healthy Mortality		Disabled Mortality	
	Future Life		Future Life	
	Expectancy (years) in 2017		Expectancy (years) in 2017	
	Men	Women	Men	Women
20	67.75	72.15	32.53	49.96
25	62.35	66.74	30.59	46.09
30	56.96	61.32	28.56	42.15
35	51.59	55.91	26.39	38.13
40	46.27	50.54	24.01	33.98
45	41.01	45.21	21.30	29.66
50	35.80	39.93	18.42	25.41
55	30.67	34.73	15.88	21.64
60	25.72	29.65	13.67	18.33
65	21.06	24.80	11.63	15.32
70	16.82	20.31	9.67	12.54
75	13.00	16.20	7.81	10.04
80	9.67	12.54	6.19	7.87
85	6.92	9.35	4.87	6.04
90	4.83	6.75	3.68	4.55
95	3.44	4.93	2.59	3.44
100	2.61	3.88	1.95	2.78
105	2.17	3.15	1.62	2.16

Actuarial Valuation Assumptions (Continued)

Rates of separation from active membership are represented by the following table (rates do not apply to members eligible to retire and do not include separation on account of death or disability). This assumption measures the probabilities of members terminating employment.

Service Beginning of Year	Service and Age-Based Rates For First Five Years of Service					
	Main System			Law Enforcement		
	Age					
	Under 30	30-39	40+	Under 30	30-39	40+
0	22.00%	16.00%	12.00%	25.00%	20.00%	17.00%
1	18.00%	14.00%	10.00%	23.00%	17.00%	15.00%
2	16.00%	12.00%	10.00%	20.00%	15.00%	12.00%
3	14.00%	12.00%	8.00%	17.00%	13.00%	10.00%
4	14.00%	11.00%	7.00%	15.00%	11.00%	7.00%

Age	Age-Based Rates Only After First Five Years of Service	
	Main System	Law Enforcement
	20-24	8.80%
25-29	8.80%	8.80%
30-34	5.50%	5.50%
35-39	4.70%	4.70%
40-44	3.90%	3.90%
45-49	3.70%	3.70%
50-54	3.40%	3.40%
55-59	0.10%	0.10%
60+	0.20%	0.20%

No pre-retirement termination is assumed for Judges.

Vested participants who terminate are assumed to elect the option with the greater present value:

- 1) *A refund of their accumulated contributions with interest or*
- 2) *A deferred benefit.*

Withdrawal rates end upon eligibility for early retirement.

Early retirement eligibility is as follows:

Main System: Earlier of (i) age 55 and 3 years of service, and (ii) eligibility for Rule of 85. For members hired on or after 1/1/2016, earlier of (i) age 55 and 3 years of service, and (ii) eligibility for Rule of 90.

Law Enforcement: Age 50 and 3 years of service.

Account Balance Due to Vested Employer Contribution (PEP): Participation Under Chapter 54-52.2: If not elected: None. If elected: 100% of active members of the Main System and Law Enforcement.
Contribution: Maximum allowed, based on service at the beginning of the Plan year.

Actuarial Valuation Assumptions (Continued)

Rates of disability:

Before age 65: Males: 20% of OASDI disability incidence rates.
Females: 10% of OASDI disability incidence rates.

Age 65 and later: 0.25% per year.

Rates of disability were as follows:

Age	All Plans	
	Male	Female
20	0.0120%	0.0060%
25	0.0171%	0.0085%
30	0.0220%	0.0110%
35	0.0295%	0.0147%
40	0.0440%	0.0220%
45	0.0719%	0.0360%
50	0.1212%	0.0606%
55	0.2018%	0.1009%
60	0.3254%	0.1627%
65	0.2500%	0.2500%

Social Security Disability (for Judges' disability benefit offset):

Eligibility: 50%
Consumer Price Index Increases: 3.5% per annum
Wage Base Increases: 5.0% per annum

Workers' Compensation (for Judges' disability benefit offset):

None assumed.

Actuarial Valuation Assumptions (Continued)

Rates of retirement for members eligible to retire during the next year were as follows:

Age	Main System		Law Enforcement	Judges
	Reduced	Unreduced	Unreduced	Unreduced
50		30.00%	25.00%	
51		10.00%	25.00%	
52		10.00%	25.00%	
53		10.00%	25.00%	
54		10.00%	25.00%	
55	1.00%	10.00%	10.00%	10.00%
56	1.00%	8.00%	10.00%	10.00%
57	1.00%	8.00%	10.00%	10.00%
58	1.00%	8.00%	10.00%	10.00%
59	1.00%	8.00%	10.00%	10.00%
60	2.00%	8.00%	10.00%	10.00%
61	5.00%	15.00%	10.00%	10.00%
62	10.00%	30.00%	50.00%	10.00%
63	10.00%	30.00%	50.00%	10.00%
64	10.00%	20.00%	50.00%	10.00%
65		30.00%	50.00%	20.00%
66		20.00%	20.00%	20.00%
67		15.00%	20.00%	20.00%
68		15.00%	20.00%	20.00%
69		15.00%	20.00%	20.00%
70		15.00%	20.00%	20.00%
71		15.00%	20.00%	20.00%
72		15.00%	20.00%	20.00%
73		15.00%	20.00%	20.00%
74		15.00%	20.00%	20.00%
75+		100.00%	100.00%	100.00%

Actuarial Valuation Assumptions (Continued)

Assumed Service

Credit: All active members (full time and part time) are assumed to earn one full year of service for each assumed future year of service.

Marital Status:

It is assumed that 75 percent of participants in the Main System and Law Enforcement and 100 percent of Judges have an eligible spouse at the time of retirement or pre-retirement death. The male spouse is assumed to be three years older than the female spouse.

Spouses are assumed to be the opposite sex of the employees and retirees. The relatively low rate of same-sex spouses does not have a material actuarial impact on the actuarial valuation results.

Form of Payment Election Assumption:	Form of Payment	Main System and Law Enforcement	Judges
	Life Annuity	50%	0%
	50% Joint and Survivor	45%	100%
	Refund of Member Contributions	5%	0%

Benefit Service:

Exact fractional years of service are used to determine the amount of benefit payable.

Decrement Timing:

Retirement is assumed to occur at the beginning of the year. All decrements are assumed to occur at the middle of the year.

Decrement Operation:

Turnover decrements do not operate after the member reaches retirement eligibility (early or normal).

Eligibility Testing:

Eligibility for benefits is determined based upon the age nearest birthday and service on the date the decrement is assumed to occur.

Pay Increase Timing:

Beginning of (fiscal) year.

Actuarial Valuation Assumptions (Continued)

Expenses: Assumed administrative expenses were added to the Normal Cost and are based on the prior year's expenses, adjusted for inflation. The assumed amount added to the Normal Cost is:

Expenses	Main System	Judges	Law Enforcement		Total
			With Prior	Without	
Assumed FY 2017	\$ 2,568,029	\$ 12,094	\$ 38,513	\$ 7,986	\$ 2,626,622
Actual FY 2017	2,550,631	11,685	37,211	7,716	2,607,243
Assumed FY 2018	2,614,397	11,977	38,141	7,909	2,672,424

Assumptions for Missing or Incomplete Data: Pay was annualized for active members who have an entry date after the last valuation date of July 1, 2016. Pay was annualized by dividing the provided pay by the maximum of one month and calculated service (based on entry date). A minimum pay amount of \$10,000 was assumed for all members. Active members in the Main System with \$0 pay provided were assumed to have pay of \$32,359, the average of non-zero annualized salary of newly hired members.

Changes in Actuarial Valuation Assumptions and Methods Since the Previous Valuation

The Board approved the following changes to the actuarial assumptions beginning with the July 1, 2017 actuarial valuation:

- The investment return assumption was lowered from 8.00 percent to 7.75 percent;
- The price inflation assumption was lowered from 3.50 percent to 2.50 percent;
- The payroll growth assumption used in calculating the amortization of the unfunded liability contribution for the actuarial contribution rate was lowered from 4.50 percent to 3.75 percent for Main System and Law Enforcement and from 4.00 percent to 3.25 percent for Judges;
- The asset valuation method was updated to smooth total investment gains or losses compared to the investment return assumption over a five-year period. Net deferred asset gains attributable to fiscal years 2016 and prior were fully recognized as of July 1, 2017.

All other actuarial assumptions and the actuarial cost method are unchanged from the last actuarial valuation as of July 1, 2016.

SECTION F

BENEFIT PROVISIONS

Benefit Provisions

This Section summarizes the major benefit provisions of the North Dakota Public Employees Retirement System as included in the actuarial valuation. It is not intended to be, nor should it be, interpreted as a complete statement of all plan provisions.

1. Normal Service Retirement:

➤ Eligibility:

Main System and Judges:

Attainment of age 65, or at any age with age plus service equal to at least 85 (Rule of 85).

For members enrolled after December 31, 2015, into the Main System, attainment of age 65, or at age 60 with age plus service equal to at least 90 (Rule of 90).

Law Enforcement:

Attainment of age 55 and three consecutive years of service, or if not former National Guard, at any age with age plus service equal to at least 85 (Rule of 85). Former National Guard is eligible for Rule of 85 on August 1, 2015.

➤ Benefit:

Main System and Law Enforcement:

2.00% of final average salary multiplied by service.

Judges:

3.50% of final average salary for each of the first ten years of service, 2.80% for each of the next ten years of service and 1.25% for service in excess of twenty years.

2. Early Retirement:

➤ Eligibility:

Main System:

Attainment of age 55 with three years of service.

Judges:

Attainment of age 55 with five years of service.

Law Enforcement:

Attainment of age 50 with three years of service.

Benefit Provisions (Continued)

➤ Benefit:

Main System:

The Normal Service Retirement Benefit as determined in the preceding section. A benefit that begins before age 65 (or Rule of 85, if earlier) is reduced by one-half of one percent for each month before the earlier of age 65 or the age at which the Rule of 85 is met.

For members enrolled after December 31, 2015, into the Main System, a benefit that begins before age 65 (or Rule of 90, if earlier) is reduced by 2/3% of one percent for each month before the earlier of age 65 or the age at which the Rule of 90 is met.

Judges:

The Normal Service Retirement Benefit as determined in the preceding section. A benefit that begins before age 65 (or Rule of 85, if earlier) is reduced by one-half of one percent for each month before age 65 or the age at which the Rule of 85 is met.

Law Enforcement:

The Normal Service Retirement Benefit as determined in the preceding section. A benefit that begins before age 55 (or Rule of 85, if earlier) is reduced by one-half of one percent for each month before age 55 or the age at which the Rule of 85 is met.

3. Disability Benefit:

➤ Eligibility:

Six months of service and inability to engage in any substantial gainful activity.

➤ Benefit:

Main System and Law Enforcement:

25% of the member's final average salary at disability minus workers' compensation benefits, with a minimum of \$100 per month.

Judges:

70% of the member's final average salary at disability minus Social Security and Workers' Compensation benefits paid.

Benefit Provisions (Continued)

4. Deferred Vested Retirement:

➤ Eligibility:

Main System and Law Enforcement:

Three years of service.

Judges:

Five years of service.

➤ Benefit:

Main System and Judges:

The Normal Service Retirement Benefit payable at age 65 or the Rule of 85, if earlier.
Reduced early retirement benefits can be elected upon attainment of age 55.

Law Enforcement:

The Normal Service Retirement Benefit payable at age 55 or the Rule of 85, if earlier.
Reduced early retirement benefit can be selected upon attainment of age 50.

5. Pre-Retirement Death Benefits:

(a) Vested participants with a surviving spouse

➤ Eligibility:

Main System and Law Enforcement:

Three years of service.

Judges:

Five years of service.

➤ Benefit:

Main System and Law Enforcement:

One of the following options:

- Lump sum payment of member's accumulated contributions with interest.

Benefit Provisions (Continued)

- 50% of the member's accrued benefit (not reduced on account of age) payable for the surviving spouse's lifetime.
- Continuation portion of 100% joint and survivor annuity (only if participant was eligible for normal retirement).
- A partial lump sum payment in addition to the one of the annuity options above.

Judges:

One of the following options:

- Lump sum payment of member's accumulated contributions with interest.
- 100% of the member's accrued benefit (not reduced on account of age) payable for the spouse's lifetime.

(b) Non-vested members or vested members without a surviving spouse

➤ Eligibility:

Main System, Judges and Law Enforcement:

Non-vested or no surviving spouse.

➤ Benefit:

Main System, Judges and Law Enforcement:

Lump sum payment of member's accumulated contributions with interest.

6. Refund of Member Contributions:

Paid to terminated non-vested members and terminated vested members who choose a refund of employee contributions in lieu of a monthly retirement benefit.

Benefit Provisions (Continued)

7. Accumulated Member Contributions:

Member contributions accumulate with interest at the following rates:

<u>Time Period</u>	<u>Per Annum Interest Rate</u>
Through June 30, 1981	5.0%
July 1, 1981, to June 30, 1986	6.0%
After June 30, 1986	0.5% less than the actuarial interest rate assumption

8. Standard and Optional Forms of Payment:

Standard form of payment:

Main System and Law Enforcement:

Monthly benefit for life with a refund to beneficiary at death of the remaining balance (if any) of accumulated member contributions.

Judges:

Monthly benefit for life, with 50% payable to an eligible survivor.

Optional forms of payment:

- Life annuity (for Judges).
- 50% joint and survivor annuity with pop-up (for Main System and Law Enforcement).
- 100% joint and survivor annuity with pop-up.
- Twenty-year certain and life annuity.
- Ten-year certain and life annuity.
- Social Security level income annuity.
- A partial lump sum payment in addition to one of the annuity options above.
- An actuarially equivalent graduated benefit option with either a one percent or two percent increase to be applied the first day of January of each year. Not available for disability or early retirements or in combination with a partial lump sum option, a deferred normal retirement option, or a Social Security level income annuity.

Benefit Provisions (Continued)

9. Final Average Salary:

Average of the highest salary received by the member for any 36 months employed during the last 180 months of employment.

10. Contributions:

Contribution rates specified in the Century Code (except employer rate for Law Enforcement); differ between permanent employees and temporary employees. Rates are as follows:

	<u>Rates Set by Statute</u>		<u>Rates Determined by the Board of Retirement</u>
	<u>Member</u>	<u>Employer</u>	<u>Employer</u>
Main System Permanent Employees	7.00%	7.12%	
Main System Temporary Employees	14.12%	0.00%	
Judges	8.00%	17.52%	
Law Enforcement with prior Main System service	5.50%		9.81%
➤ BCI Employees	6.00%		9.81%
➤ National Guard members	5.50%		9.81%
Law Enforcement without prior Main System service	5.50%		7.93%

Effective January 1, 2000:

A member's account balance includes vested employer contributions equal to the member's contributions to the deferred compensation Plan under chapter 54-52.2. The vested employer contribution may not exceed:

1. For months one through 12 of service credit, \$25 or 1% of the member's monthly salary, whichever is greater.
2. For months 13 through 24 of service credit, \$25 or 2% of the member's monthly salary, whichever is greater.
3. For months 25 through 36 of service credit, \$25 or 3% of the member's monthly salary, whichever is greater.
4. For service exceeding 36 months, \$25 or 4% of the member's monthly salary, whichever is greater.

Benefit Provisions (Continued)

Vested employer contributions are credited monthly to the member's account balance.

11. Rollovers:

The fund may accept rollovers from other qualified plans under rules adopted by the Board for the purchase of additional service credit.

Changes in Plan Provisions Since the Previous Actuarial Valuation

There have been no changes in plan provisions since the previous valuation as of July 1, 2016.

SECTION G

CALCULATION OF THE SINGLE DISCOUNT RATE

Calculation of the Single Discount Rate

GASB Statement No. 67 includes a specific requirement for the discount rate that is used for the purpose of the measurement of the Total Pension Liability. This rate considers the ability of the System to meet benefit obligations in the future. To make this determination, employer contributions, employee contributions, benefit payments, expenses and investment returns are projected into the future. The current employer and employee fixed rate contributions are assumed to be made in each future year. The Plan Net Position (assets) in future years can then be determined and compared to its obligation to make benefit payments in those years. As long as assets are projected to be on hand in a future year, the assumed valuation discount rate is used. In years where assets are not projected to be sufficient to meet benefit payments, the use of a municipal bond rate is required, as described in the following paragraph.

The Single Discount Rate (SDR) is equivalent to applying these two rates to the benefits that are projected to be paid during the different time periods. The SDR reflects (1) the long-term expected rate of return on pension plan investments (during the period in which the fiduciary net position is projected to be sufficient to pay benefits) and (2) a tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is 7.75%; the municipal bond rate is 3.56%; and the resulting Single Discount Rate is 6.44%.

The tables in this section provide detailed information on the development of the Single Discount Rate.

The **Projection of Contributions** table shows the development of expected contributions in future years. Normal Cost contributions for future hires are not included (nor are their liabilities).

The **Projection of Plan Fiduciary Net Position** table shows the development of expected asset levels in future years.

The **Present Values of Projected Benefit Payments** table shows the development of the Single Discount Rate (SDR). It breaks down the benefit payments into present values for funded and unfunded portions and shows the equivalent total at the SDR.

As shown on Page G-7, the sum of the present value of (1) the funded portion of projected benefit payments using the expected 7.75% rate of return on assets plus (2) the present value of the unfunded projected benefit payments using a tax-exempt municipal bond rate of 3.56% is equal to the present value of all projected benefit payments using a single equivalent discount rate of 6.44%.

Projection of Contributions by Plan

Year	Main System			Judges			Law Enforcement with Prior Service			Law Enforcement without Prior Service			Total		
	Projected Contributions from Current Employees	Projected Contributions from Employer	Projected Total Contributions	Projected Contributions from Current Employees	Projected Contributions from Employer	Projected Total Contributions	Projected Contributions from Current Employees	Projected Contributions from Employer	Projected Total Contributions	Projected Contributions from Current Employees	Projected Contributions from Employer	Projected Total Contributions	Projected Contributions from Current Employees	Projected Contributions from Employer	Projected Total Contributions
2018	\$ 76,399,789	\$ 77,536,180	\$ 153,935,969	\$ 654,459	\$ 1,432,104	\$ 2,086,562	\$ 1,752,229	\$ 3,088,909	\$ 4,841,138	\$ 361,914	\$ 520,813	\$ 882,727	\$ 79,168,391	\$ 82,578,006	\$ 161,746,397
2019	74,455,839	86,318,146	160,773,985	608,827	1,552,202	2,161,029	1,659,349	3,360,109	5,019,457	341,260	587,484	928,745	77,065,275	91,817,972	168,883,217
2020	73,004,019	85,863,543	158,867,563	578,733	1,480,692	2,059,425	1,585,473	3,300,147	4,885,620	324,461	553,192	877,652	75,492,685	91,197,574	166,690,260
2021	71,870,514	87,364,986	159,235,500	547,803	1,446,559	1,994,362	1,527,941	3,335,071	4,863,012	307,340	546,724	854,064	74,253,598	92,693,340	166,946,938
2022	70,976,802	88,184,920	159,161,722	512,417	1,414,002	1,926,420	1,489,057	3,340,084	4,829,141	294,909	523,376	818,285	73,273,186	93,462,382	166,735,568
2023	70,118,079	89,297,000	159,415,079	479,230	1,369,492	1,848,723	1,454,083	3,372,286	4,826,369	284,987	511,629	796,616	72,336,379	94,550,407	166,886,786
2024	69,247,419	90,631,163	159,878,582	444,916	1,327,665	1,772,582	1,421,229	3,404,329	4,825,558	275,140	499,902	775,042	71,388,704	95,863,058	167,251,763
2025	68,240,959	92,047,922	160,288,881	416,162	1,281,047	1,697,209	1,389,216	3,446,906	4,836,122	265,418	489,133	754,551	70,311,755	97,265,008	167,576,763
2026	67,070,294	93,417,026	160,487,320	387,678	1,250,050	1,637,728	1,359,140	3,494,018	4,853,158	255,734	479,389	735,123	69,072,845	98,640,483	167,713,329
2027	65,815,482	94,710,640	160,526,122	363,883	1,219,222	1,583,106	1,326,535	3,545,279	4,871,814	245,054	467,629	712,683	67,750,954	99,942,770	167,693,724
2028	64,455,770	96,002,267	160,458,037	344,383	1,199,557	1,543,940	1,298,480	3,599,835	4,898,315	239,004	457,394	696,397	66,337,636	101,259,053	167,596,689
2029	63,012,817	97,223,122	160,235,939	320,265	1,193,082	1,513,347	1,269,243	3,665,744	4,934,987	232,183	452,995	685,178	64,834,508	102,534,942	167,369,450
2030	61,517,002	98,437,556	159,954,558	299,170	1,180,250	1,479,420	1,244,288	3,733,803	4,978,091	223,543	446,495	670,038	63,284,003	103,798,104	167,082,107
2031	60,054,749	99,653,390	159,708,139	279,727	1,171,146	1,450,873	1,222,331	3,811,708	5,034,040	213,912	439,957	653,869	61,076,201	105,076,201	166,846,920
2032	58,578,325	100,958,021	159,536,346	255,583	1,173,752	1,429,335	1,199,964	3,892,614	5,092,578	202,921	429,176	632,098	60,236,793	106,453,564	166,690,356
2033	56,982,385	102,281,329	159,263,715	234,655	1,163,368	1,398,023	1,168,590	3,974,853	5,143,444	193,068	415,152	608,221	58,578,699	107,834,703	166,413,402
2034	55,308,781	103,598,730	158,907,511	217,379	1,159,836	1,377,215	1,130,174	4,046,403	5,176,577	181,550	401,969	583,519	56,837,884	109,206,937	166,044,821
2035	53,555,372	104,909,568	158,464,940	204,472	1,159,967	1,364,439	1,086,578	4,109,979	5,196,558	170,582	387,959	558,408	55,016,873	110,567,473	165,584,346
2036	51,677,530	106,178,659	157,856,189	193,467	1,173,793	1,367,260	1,035,136	4,167,603	5,202,199	159,450	375,169	534,751	53,065,714	111,894,685	164,960,399
2037	49,723,369	107,433,227	157,156,596	181,864	1,192,571	1,374,435	968,999	4,207,665	5,176,664	149,541	362,387	511,928	51,023,773	113,195,850	164,219,623
2038	47,655,871	108,624,333	156,280,204	166,368	1,212,813	1,379,181	889,850	4,221,072	5,110,922	137,018	348,397	485,415	48,849,107	114,406,614	163,255,722
2039	45,398,554	109,764,890	155,163,444	146,717	1,225,647	1,372,364	811,885	4,221,256	5,033,141	124,714	331,892	456,606	46,481,870	115,543,686	162,025,556
2040	43,046,649	110,792,459	153,839,108	130,484	1,224,190	1,354,674	731,144	4,210,006	4,941,150	114,508	316,451	430,958	44,022,784	116,543,106	160,565,890
2041	40,652,118	111,754,538	152,406,656	114,892	1,228,753	1,343,645	654,428	4,193,021	4,847,449	104,740	298,779	403,518	41,526,177	117,475,091	159,001,268
2042	38,228,393	112,629,236	150,857,629	100,257	1,234,046	1,334,303	584,434	4,185,090	4,769,524	93,357	281,178	374,535	39,006,441	118,329,549	157,335,990
2043	35,720,607	113,508,165	149,228,772	88,014	1,236,880	1,324,895	515,939	4,172,148	4,688,087	83,006	265,776	348,782	36,407,566	119,182,970	155,590,536
2044	33,177,172	114,338,138	147,515,310	77,494	1,248,066	1,325,561	451,653	4,155,155	4,606,808	72,787	247,819	320,606	33,779,106	119,989,178	153,768,284
2045	30,540,004	114,965,467	145,505,471	67,627	1,259,960	1,327,586	390,189	4,132,783	4,522,972	63,643	227,164	290,807	31,061,463	120,585,373	151,646,836
2046	27,834,363	115,072,079	142,906,442	59,163	1,274,347	1,333,511	331,974	4,103,314	4,435,288	53,755	209,960	263,714	28,279,256	120,659,700	148,938,955
2047	25,167,851	114,731,556	139,899,407	51,078	1,296,605	1,347,683	280,617	4,095,507	4,376,124	44,983	190,905	235,888	25,544,528	120,314,573	145,859,102
2048	22,548,437	114,192,774	136,741,211	42,442	1,321,593	1,364,035	239,428	4,107,556	4,346,984	37,783	175,956	213,739	22,868,090	119,797,879	142,665,969
2049	20,054,484	113,549,244	133,603,729	33,060	1,346,733	1,379,794	200,428	4,149,272	4,349,700	31,996	163,335	195,331	20,319,969	119,208,584	139,528,553
2050	17,694,336	112,946,729	130,641,066	26,091	1,368,089	1,394,180	164,271	4,208,908	4,373,179	25,889	153,235	179,123	17,910,586	118,676,962	136,587,548
2051	15,515,763	112,316,656	127,832,418	20,416	1,396,175	1,416,591	136,014	4,290,677	4,426,690	21,019	143,969	164,988	15,693,211	118,147,476	133,840,687
2052	13,487,423	111,673,625	125,161,049	15,706	1,432,714	1,448,420	110,250	4,382,499	4,492,749	17,616	138,726	156,343	13,630,996	117,627,564	131,258,560
2053	11,649,808	111,097,387	122,747,194	11,702	1,469,303	1,481,004	88,795	4,488,971	4,577,766	14,932	134,709	149,641	11,765,237	117,190,369	128,955,606
2054	9,951,297	110,514,392	120,465,689	9,557	1,513,841	1,523,398	70,858	4,611,461	4,682,319	12,139	132,030	144,170	10,043,851	116,771,724	126,815,575
2055	8,393,139	109,880,753	118,273,892	7,792	1,561,149	1,568,941	53,278	4,740,814	4,794,092	9,745	131,163	140,908	8,463,954	116,313,879	124,777,833
2056	6,983,249	109,370,238	116,353,487	6,341	1,616,096	1,622,438	39,031	4,879,738	4,918,769	7,562	131,305	138,867	7,036,183	115,997,378	123,033,561
2057	5,732,786	109,182,714	114,915,500	5,150	1,670,519	1,675,669	27,319	5,025,291	5,052,610	5,803	131,109	136,912	5,771,057	116,009,634	121,780,691
2058	4,632,999	109,718,636	114,351,635	1,625	1,733,047	1,734,672	17,653	5,177,073	5,194,726	4,011	132,929	136,940	4,656,288	116,761,685	121,417,973
2059	3,730,686	110,892,496	114,623,181	-	1,792,375	1,792,375	11,130	5,347,588	5,358,718	2,623	134,425	137,048	3,744,439	118,166,883	121,911,322
2060	2,983,528	112,918,950	115,902,477	-	1,848,506	1,848,506	7,584	5,529,084	5,536,668	1,729	137,898	139,627	2,992,840	120,434,438	123,427,278
2061	2,368,368	115,554,739	117,923,107	-	1,922,073	1,922,073	5,312	5,727,159	5,732,472	1,237	142,911	144,148	2,374,918	123,346,882	125,721,799
2062	1,861,723	118,876,432	120,738,155	-	1,995,469	1,995,469	3,879	5,937,562	5,941,441	817	149,682	150,500	1,866,419	126,959,146	128,825,565
2063	1,457,958	122,768,357	124,226,314	-	2,070,250	2,070,250	2,865	6,158,882	6,161,747	555	157,065	157,620	1,461,378	131,154,554	132,615,932
2064	1,130,890	127,101,686	128,232,576	-	2,148,793	2,148,793	2,169	6,389,764	6,391,933	397	165,233	165,630	1,133,456	135,805,476	136,938,932
2065	867,897	131,867,092	132,734,988	-	2,229,881	2,229,881	1,577	6,630,353	6,631,930	300	174,421	174,721	869,773	140,901,747	141,771,520
2066	659,982	137,049,685	137,709,666	-	2,314,940	2,314,940	1,151	6,882,810	6,883,960	234	184,696	184,930	661,366	146,432,131	147,093,497
2067	482,804	142,645,418	143,128,222	-	2,402,340	2,402,340	814	7,147,996	7,148,810	167	195,786	195,953	483,784	152,391,540	152,875,325

Projection of Benefit Payments and Administrative Expenses by Plan

Year	Main System		Judges		Law Enforcement with Prior Service		Law Enforcement without Prior Service		Total	
	Projected Benefit Payments	Projected Administrative Expenses	Projected Benefit Payments	Projected Administrative Expenses	Projected Benefit Payments	Projected Administrative Expenses	Projected Benefit Payments	Projected Administrative Expenses	Projected Benefit Payments	Projected Administrative Expenses
2018	\$ 178,526,081	\$ 2,437,627	\$ 2,981,458	\$ 10,183	\$ 2,544,265	\$ 36,899	\$ 187,405	\$ 8,917	\$ 184,239,210	\$ 2,493,626
2019	190,866,633	2,342,613	3,149,565	9,556	2,905,176	34,897	212,467	8,355	197,133,841	2,395,421
2020	202,280,598	2,258,396	3,313,389	8,933	3,210,827	33,110	279,069	7,783	209,083,883	2,308,222
2021	215,900,895	2,184,743	3,490,746	8,258	3,487,676	31,501	319,382	7,295	223,198,699	2,231,797
2022	231,190,429	2,116,801	3,665,785	7,634	3,771,702	30,035	373,493	6,863	239,001,410	2,161,334
2023	246,808,870	2,051,371	3,870,041	7,012	4,086,328	28,660	438,702	6,450	255,203,941	2,093,493
2024	263,344,596	1,984,846	4,027,566	6,487	4,427,233	27,362	505,194	6,065	272,304,588	2,024,761
2025	280,730,527	1,916,676	4,191,002	5,979	4,740,877	26,154	566,656	5,701	290,229,062	1,954,509
2026	298,404,492	1,848,411	4,316,338	5,552	5,087,384	24,969	640,406	5,343	308,448,620	1,884,275
2027	316,820,916	1,779,549	4,409,808	5,199	5,416,747	23,900	691,328	5,080	327,338,799	1,813,728
2028	335,746,231	1,710,833	4,506,030	4,787	5,764,980	22,862	756,482	4,818	346,773,721	1,743,301
2029	354,692,639	1,642,935	4,579,659	4,428	6,098,530	21,930	834,927	4,544	366,205,755	1,673,836
2030	373,197,137	1,577,513	4,634,442	4,100	6,402,875	21,072	917,339	4,265	385,151,792	1,606,949
2031	391,693,457	1,513,599	4,711,843	3,712	6,735,101	20,248	994,640	3,976	404,135,042	1,541,536
2032	410,774,078	1,449,039	4,759,532	3,377	7,138,933	19,342	1,074,930	3,715	423,747,472	1,475,472
2033	426,250,040	1,384,520	4,786,023	3,100	7,438,769	18,369	1,161,728	3,438	439,636,561	1,409,427
2034	445,939,855	1,320,110	4,774,759	2,888	7,923,757	17,362	1,258,342	3,177	459,896,712	1,343,537
2035	466,455,610	1,254,927	4,747,048	2,707	8,496,736	16,285	1,370,440	2,929	481,069,833	1,276,847
2036	486,975,524	1,189,752	4,724,146	2,521	9,208,408	15,044	1,482,850	2,703	502,390,928	1,210,020
2037	507,832,796	1,123,910	4,710,353	2,287	10,035,772	13,656	1,604,598	2,444	524,183,519	1,142,297
2038	529,707,082	1,055,911	4,719,086	2,001	10,834,928	12,312	1,735,607	2,195	546,996,703	1,072,419
2039	551,586,541	987,646	4,699,999	1,765	11,640,554	10,960	1,844,879	1,987	569,771,972	1,002,357
2040	573,733,019	920,157	4,676,523	1,542	12,417,432	9,693	1,940,716	1,793	592,767,691	933,184
2041	595,488,407	853,801	4,642,148	1,335	13,145,010	8,554	2,064,166	1,578	615,339,731	865,268
2042	617,107,605	787,408	4,584,364	1,163	13,849,307	7,462	2,185,015	1,386	637,726,291	797,419
2043	638,180,846	721,906	4,507,774	1,016	14,503,821	6,456	2,280,412	1,201	659,472,853	730,580
2044	658,708,114	656,134	4,421,936	880	15,100,468	5,515	2,366,313	1,038	680,596,830	663,567
2045	678,717,671	590,618	4,322,706	764	15,662,159	4,641	2,471,554	867	701,174,090	596,860
2046	697,012,325	527,459	4,218,215	655	16,095,203	3,880	2,562,021	718	719,887,764	532,711
2047	713,304,423	466,825	4,115,318	540	16,377,341	3,272	2,624,924	596	736,422,005	471,233
2048	726,739,862	410,142	4,019,289	418	16,647,875	2,708	2,669,595	499	750,076,621	413,767
2049	737,272,980	357,455	3,901,367	327	16,876,518	2,195	2,717,178	399	760,768,043	360,375
2050	744,524,319	309,617	3,772,918	254	16,994,197	1,796	2,744,759	320	768,036,193	311,987
2051	749,201,816	265,892	3,638,422	194	17,080,809	1,439	2,750,529	265	772,671,577	267,790
2052	750,906,758	226,851	3,500,704	144	17,099,911	1,145	2,745,937	222	774,253,310	228,362
2053	750,662,906	191,451	3,348,772	117	17,068,009	903	2,742,507	178	773,822,193	192,649
2054	748,327,315	159,548	3,197,698	94	17,021,645	671	2,730,262	142	771,276,919	160,455
2055	743,572,674	131,169	3,048,223	76	16,912,293	486	2,712,506	109	766,245,697	131,840
2056	736,032,695	106,394	2,900,834	61	16,761,946	336	2,686,768	82	758,382,243	106,874
2057	725,807,326	84,965	2,781,360	19	16,574,949	214	2,659,609	56	747,823,243	85,255
2058	712,679,040	67,604	2,645,552	-	16,334,006	133	2,623,771	36	734,282,369	67,773
2059	697,166,365	53,415	2,496,915	-	16,044,125	90	2,579,186	24	718,286,591	53,529
2060	679,628,256	41,893	2,352,160	-	15,729,600	62	2,527,462	17	700,237,478	41,972
2061	660,528,140	32,536	2,211,106	-	15,392,290	45	2,473,562	11	680,605,098	32,592
2062	639,996,433	25,173	2,073,631	-	15,037,276	33	2,415,032	7	659,522,372	25,213
2063	618,383,149	19,291	1,939,643	-	14,663,944	24	2,353,014	5	637,339,750	19,321
2064	595,804,240	14,626	1,809,036	-	14,275,789	18	2,287,648	4	614,176,713	14,648
2065	572,408,772	10,988	1,681,623	-	13,870,427	13	2,219,510	3	590,180,331	11,004
2066	548,556,984	7,941	1,557,203	-	13,449,118	9	2,149,114	2	565,712,419	7,952
2067	524,237,604	5,417	1,435,755	-	13,011,912	5	2,075,806	1	540,761,077	5,423

Projection of Contributions

Year	Projected Contributions from Current Employees	Projected Service Cost and Expense Contributions	Projected UAL Contributions	Projected Total Contributions
2018	\$ 79,168,391	\$ 46,152,993	\$ 36,425,013	\$ 161,746,397
2019	77,065,275	44,845,463	46,972,479	168,883,217
2020	75,492,685	43,850,762	47,346,812	166,690,260
2021	74,253,598	43,017,024	49,676,317	166,946,938
2022	73,273,186	42,326,921	51,135,461	166,735,568
2023	72,336,379	41,633,479	52,916,928	166,886,786
2024	71,388,704	40,918,607	54,944,451	167,251,763
2025	70,311,755	40,119,434	57,145,575	167,576,763
2026	69,072,845	39,215,260	59,425,223	167,713,329
2027	67,750,954	38,258,741	61,684,029	167,693,724
2028	66,337,636	37,260,027	63,999,026	167,596,689
2029	64,834,508	36,210,601	66,324,341	167,369,450
2030	63,284,003	35,146,004	68,652,100	167,082,107
2031	61,770,720	34,114,374	70,961,827	166,846,920
2032	60,236,793	33,070,427	73,383,137	166,690,356
2033	58,578,699	31,951,175	75,883,527	166,413,402
2034	56,837,884	30,791,718	78,415,219	166,044,821
2035	55,016,873	29,596,088	80,971,385	165,584,346
2036	53,065,714	28,329,908	83,564,777	164,960,399
2037	51,023,773	27,015,805	86,180,045	164,219,623
2038	48,849,107	25,634,744	88,771,871	163,255,722
2039	46,481,870	24,156,732	91,386,954	162,025,556
2040	44,022,784	22,648,368	93,894,737	160,565,890
2041	41,526,177	21,150,441	96,324,650	159,001,268
2042	39,006,441	19,681,037	98,648,512	157,335,990
2043	36,407,566	18,200,530	100,982,440	155,590,536
2044	33,779,106	16,740,538	103,248,640	153,768,284
2045	31,061,463	15,253,640	105,331,733	151,646,836
2046	28,279,256	13,754,489	106,905,210	148,938,955
2047	25,544,528	12,300,019	108,014,555	145,859,102
2048	22,868,090	10,892,838	108,905,041	142,665,969
2049	20,319,969	9,565,302	109,643,282	139,528,553
2050	17,910,586	8,327,351	110,349,611	136,587,548
2051	15,693,211	7,201,007	110,946,469	133,840,687
2052	13,630,996	6,169,288	111,458,277	131,258,560
2053	11,765,237	5,250,023	111,940,346	128,955,606
2054	10,043,851	4,418,885	112,352,840	126,815,575
2055	8,463,954	3,673,674	112,640,204	124,777,833
2056	7,036,183	3,019,276	112,978,102	123,033,561
2057	5,771,057	2,453,292	113,556,342	121,780,691
2058	4,656,288	1,964,804	114,796,881	121,417,973
2059	3,744,439	1,571,791	116,595,092	121,911,322
2060	2,992,840	1,250,444	119,183,994	123,427,278
2061	2,374,918	987,440	122,359,441	125,721,799
2062	1,866,419	769,206	126,189,940	128,825,565
2063	1,461,378	594,665	130,559,889	132,615,932
2064	1,133,456	453,669	135,351,808	136,938,932
2065	869,773	341,765	140,559,982	141,771,520
2066	661,366	254,594	146,177,537	147,093,497
2067	483,784	180,600	152,210,940	152,875,325

Projection of Plan Fiduciary Net Position

Year	Projected Beginning Plan Fiduciary Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings at 7.750%	Projected Ending Plan Fiduciary Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
2018	\$ 2,727,835,590	\$ 161,746,397	\$ 184,239,210	\$ 2,493,626	\$ 210,457,100	\$ 2,913,306,250
2019	2,913,306,250	168,883,217	197,133,841	2,395,421	224,615,858	3,107,276,064
2020	3,107,276,064	166,690,260	209,083,883	2,308,222	239,114,019	3,301,688,238
2021	3,301,688,238	166,946,938	223,198,699	2,231,797	253,656,886	3,496,861,566
2022	3,496,861,566	166,735,568	239,001,410	2,161,334	268,176,531	3,690,610,921
2023	3,690,610,921	166,886,786	255,203,941	2,093,493	282,584,303	3,882,784,576
2024	3,882,784,576	167,251,763	272,304,588	2,024,761	296,843,968	4,072,550,959
2025	4,072,550,959	167,576,763	290,229,062	1,954,509	310,884,279	4,258,828,431
2026	4,258,828,431	167,713,329	308,448,620	1,884,275	324,635,813	4,440,844,677
2027	4,440,844,677	167,693,724	327,338,799	1,813,728	338,025,673	4,617,411,547
2028	4,617,411,547	167,596,689	346,773,721	1,743,301	350,969,542	4,787,460,756
2029	4,787,460,756	167,369,450	366,205,755	1,673,836	363,403,415	4,950,354,030
2030	4,950,354,030	167,082,107	385,151,792	1,606,949	375,298,800	5,105,976,196
2031	5,105,976,196	166,846,920	404,135,042	1,541,536	386,631,186	5,253,777,723
2032	5,253,777,723	166,690,356	423,747,472	1,475,472	397,336,561	5,392,581,697
2033	5,392,581,697	166,413,402	439,636,561	1,409,427	407,481,635	5,525,430,746
2034	5,525,430,746	166,044,821	459,896,712	1,343,537	416,995,494	5,647,230,812
2035	5,647,230,812	165,584,346	481,069,833	1,276,847	425,614,875	5,756,083,351
2036	5,756,083,351	164,960,399	502,390,928	1,210,020	433,218,984	5,850,661,786
2037	5,850,661,786	164,219,623	524,183,519	1,142,297	439,694,512	5,929,250,107
2038	5,929,250,107	163,255,722	546,996,703	1,072,419	444,883,594	5,989,320,301
2039	5,989,320,301	162,025,556	569,771,972	1,002,357	448,628,844	6,029,200,371
2040	6,029,200,371	160,565,890	592,767,691	933,184	450,792,216	6,046,857,602
2041	6,046,857,602	159,001,268	615,339,731	865,268	451,245,389	6,040,899,261
2042	6,040,899,261	157,335,990	637,726,291	797,419	449,871,579	6,009,583,120
2043	6,009,583,120	155,590,536	659,472,853	730,580	446,553,790	5,951,524,012
2044	5,951,524,012	153,768,284	680,596,830	663,567	441,184,182	5,865,216,081
2045	5,865,216,081	151,646,836	701,174,090	596,890	433,634,689	5,748,726,627
2046	5,748,726,627	148,938,955	719,887,764	532,711	423,794,600	5,601,039,707
2047	5,601,039,707	145,859,102	736,422,005	471,233	411,605,337	5,421,610,907
2048	5,421,610,907	142,665,969	750,076,621	413,767	397,061,122	5,210,847,610
2049	5,210,847,610	139,528,553	760,768,043	360,375	380,203,127	4,969,450,871
2050	4,969,450,871	136,587,548	768,036,193	311,987	361,108,497	4,698,798,737
2051	4,698,798,737	133,840,687	772,671,577	267,790	339,853,913	4,399,553,970
2052	4,399,553,970	131,258,560	774,253,310	228,362	316,505,604	4,072,836,462
2053	4,072,836,462	128,955,606	773,822,193	192,649	291,115,175	3,718,892,400
2054	3,718,892,400	126,815,575	771,276,919	160,455	263,701,144	3,337,971,745
2055	3,337,971,745	124,777,833	766,245,697	131,840	234,294,715	2,930,666,756
2056	2,930,666,756	123,033,561	758,382,243	106,874	202,962,221	2,498,173,422
2057	2,498,173,422	121,780,691	747,823,243	85,255	169,798,694	2,041,844,308
2058	2,041,844,308	121,417,973	734,282,369	67,773	134,934,978	1,563,847,117
2059	1,563,847,117	121,911,322	718,286,591	53,529	98,517,769	1,065,936,089
2060	1,065,936,089	123,427,278	700,237,478	41,972	60,674,104	549,758,020
2061	549,758,020	125,721,799	680,605,098	32,592	21,504,474	16,346,604
2062	16,346,604	128,825,565	659,522,372	25,213	0	0
2063	0	132,615,932	637,339,750	19,321	0	0
2064	0	136,938,932	614,176,713	14,648	0	0
2065	0	141,771,520	590,180,331	11,004	0	0
2066	0	147,093,497	565,712,419	7,952	0	0
2067	0	152,875,325	540,761,077	5,423	0	0

Discount Rate Development

Present Values of Projected Benefits ending June 30 for 2018 to 2067

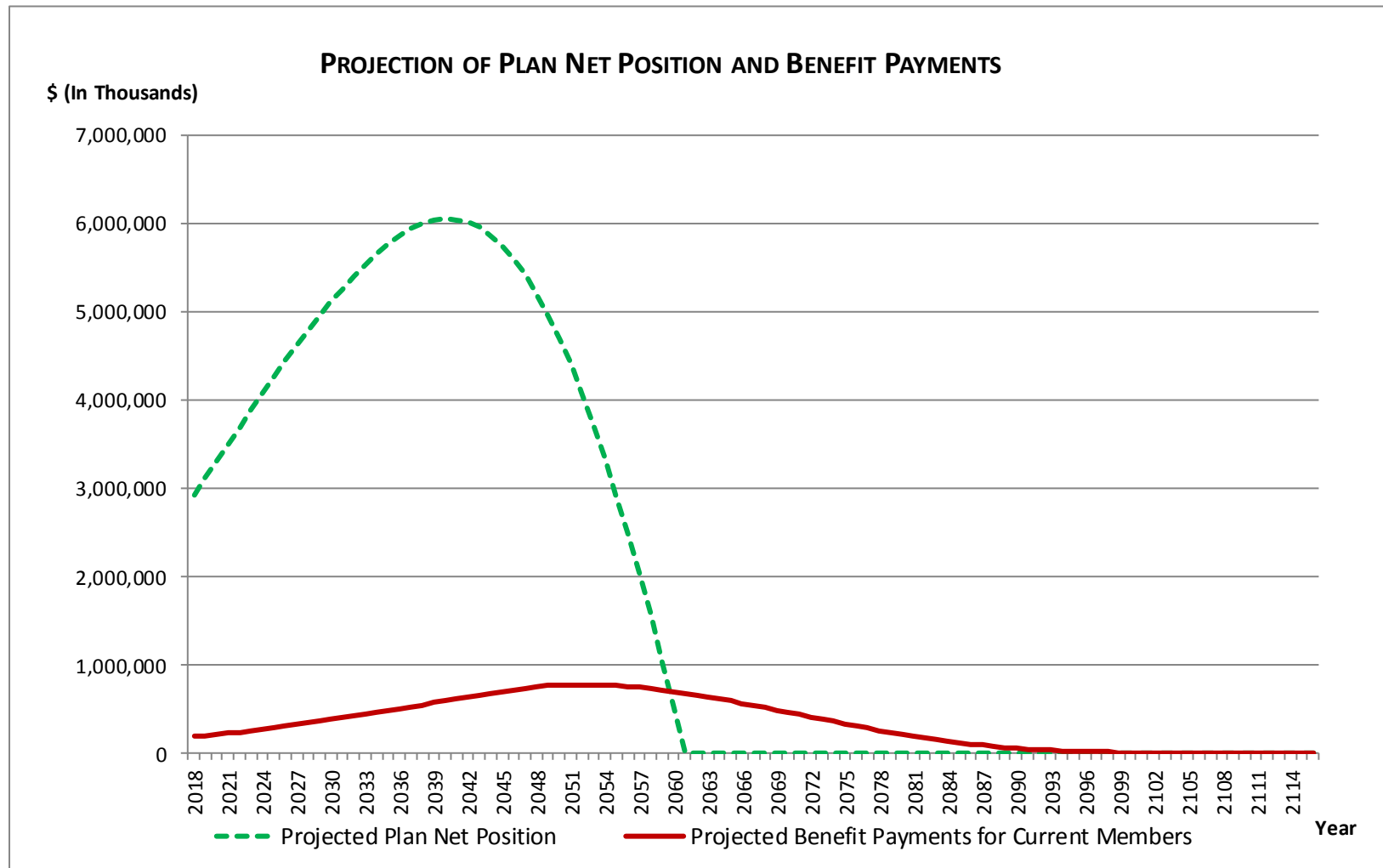
Year	Projected Beginning Plan Fiduciary Net Position	Projected Benefit Payments	Funded Portion of Projected Benefit Payments	Unfunded Portion of Projected Benefit Payments	Present Value of Funded Benefit Payments using Expected Return Rate of 7.75% (v)	Present Value of Unfunded Benefit Payments using Municipal Bond Rate of 3.56% (vf)	Present Value of All Benefit Payments using Single Discount Rate (SDR) of 6.44% (h)
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v ^{(a)-5}	(g)=(e)*vf ^{(a)-5}	(h)=(c)/(1+SDR) ^{(a)-5}
2018	\$ 2,727,835,590	\$ 184,239,210	\$ 184,239,210	\$ 0	\$ 177,489,809	\$ 0	\$ 178,575,240
2019	2,913,306,250	197,133,841	197,133,841	0	176,252,491	0	179,505,900
2020	3,107,276,064	209,083,883	209,083,883	0	173,491,163	0	178,861,333
2021	3,301,688,238	223,198,699	223,198,699	0	171,882,311	0	179,376,658
2022	3,496,861,566	239,001,410	239,001,410	0	170,813,703	0	180,448,425
2023	3,690,610,921	255,203,941	255,203,941	0	169,274,813	0	181,016,586
2024	3,882,784,576	272,304,588	272,304,588	0	167,626,488	0	181,453,068
2025	4,072,550,959	290,229,062	290,229,062	0	165,810,224	0	181,688,993
2026	4,258,828,431	308,448,620	308,448,620	0	163,544,507	0	181,404,858
2027	4,440,844,677	327,338,799	327,338,799	0	161,076,927	0	180,859,752
2028	4,617,411,547	346,773,721	346,773,721	0	158,367,022	0	179,998,542
2029	4,787,460,756	366,205,755	366,205,755	0	155,212,416	0	178,577,334
2030	4,950,354,030	385,151,792	385,151,792	0	151,501,153	0	176,445,853
2031	5,105,976,196	404,135,042	404,135,042	0	147,534,383	0	173,933,968
2032	5,253,777,723	423,747,472	423,747,472	0	143,567,645	0	171,333,931
2033	5,392,581,697	439,636,561	439,636,561	0	138,237,535	0	166,996,905
2034	5,525,430,746	459,896,712	459,896,712	0	134,207,011	0	164,116,894
2035	5,647,230,812	481,069,833	481,069,833	0	130,288,398	0	161,279,612
2036	5,756,083,351	502,390,928	502,390,928	0	126,276,382	0	158,230,973
2037	5,850,661,786	524,183,519	524,183,519	0	122,277,464	0	155,099,870
2038	5,929,250,107	546,996,703	546,996,703	0	118,421,482	0	152,051,652
2039	5,989,320,301	569,771,972	569,771,972	0	114,479,991	0	148,794,158
2040	6,029,200,371	592,767,691	592,767,691	0	110,533,965	0	145,427,884
2041	6,046,857,602	615,339,731	615,339,731	0	106,490,019	0	141,826,204
2042	6,040,899,261	637,726,291	637,726,291	0	102,426,183	0	138,087,449
2043	6,009,583,120	659,472,853	659,472,853	0	98,300,633	0	134,151,388
2044	5,951,524,012	680,596,830	680,596,830	0	94,152,538	0	130,066,823
2045	5,865,216,081	701,174,090	701,174,090	0	90,022,422	0	125,886,985
2046	5,748,726,627	719,887,764	719,887,764	0	85,777,295	0	121,422,209
2047	5,601,039,707	736,422,005	736,422,005	0	81,436,112	0	116,691,294
2048	5,421,610,907	750,076,621	750,076,621	0	76,980,127	0	111,659,503
2049	5,210,847,610	760,768,043	760,768,043	0	72,461,610	0	106,394,869
2050	4,969,450,871	768,036,193	768,036,193	0	67,892,238	0	100,908,668
2051	4,698,798,737	772,671,577	772,671,577	0	63,389,320	0	95,371,823
2052	4,399,553,970	774,253,310	774,253,310	0	58,950,426	0	89,781,443
2053	4,072,836,462	773,822,193	773,822,193	0	54,679,909	0	84,299,123
2054	3,718,892,400	771,276,919	771,276,919	0	50,580,097	0	78,935,174
2055	3,337,971,745	766,245,697	766,245,697	0	46,635,871	0	73,672,711
2056	2,930,666,756	758,382,243	758,382,243	0	42,837,382	0	68,502,294
2057	2,498,173,422	747,823,243	747,823,243	0	39,202,742	0	63,459,155
2058	2,041,844,308	734,282,369	734,282,369	0	35,724,265	0	58,537,853
2059	1,563,847,117	718,286,591	718,286,591	0	32,432,519	0	53,795,978
2060	1,065,936,089	700,237,478	700,237,478	0	29,343,438	0	49,269,229
2061	549,758,020	680,605,098	675,479,819	5,125,278	26,270,041	1,119,086	44,988,755
2062	16,346,604	659,522,372	0	659,522,372	0	113,685,677	40,955,919
2063	0	637,339,750	0	637,339,750	0	129,757,690	37,182,322
2064	0	614,176,713	0	614,176,713	0	120,743,401	33,661,790
2065	0	590,180,331	0	590,180,331	0	112,037,329	30,388,339
2066	0	565,712,419	0	565,712,419	0	103,700,700	27,365,054
2067	0	540,761,077	0	540,761,077	0	95,719,265	24,574,482

Discount Rate Development

Present Values of Projected Benefits Ending June 30 for 2068 to 2166

Year	Projected Beginning Plan Fiduciary Net Position	Projected Benefit Payments	Funded Portion of Projected Benefit Payments	Unfunded Portion of Projected Benefit Payments	Present Value of Funded Benefit Payments using Expected Return Rate (v)	Present Value of Unfunded Benefit Payments using Municipal Bond Rate of 3.56% (vf)	Present Value of All Benefit Payments using Single Discount Rate (SDR) of 6.44%
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v ^a ((a)-.5)	(g)=(e)*vf ^a ((a)-.5)	(h)=((c)/(1+SDR)) ^a ((a)-.5)
2068	\$	0	\$ 515,079,248	\$	0	\$ 88,039,171	\$ 21,990,311
2069		0	489,297,250	0	0	80,757,455	19,624,945
2070		0	463,146,572	0	0	73,813,579	17,451,489
2071		0	436,758,214	0	0	67,215,100	15,460,854
2072		0	410,269,010	0	0	60,968,069	13,643,930
2073		0	383,962,832	0	0	55,097,370	11,996,051
2074		0	357,866,584	0	0	49,587,337	10,503,853
2075		0	332,103,224	0	0	44,435,563	9,157,543
2076		0	306,850,123	0	0	39,645,314	7,948,964
2077		0	282,189,582	0	0	35,205,822	6,867,577
2078		0	258,224,740	0	0	31,108,518	5,903,897
2079		0	235,062,885	0	0	27,344,721	5,048,977
2080		0	212,259,320	0	0	23,843,179	4,283,161
2081		0	191,072,784	0	0	20,725,460	3,622,220
2082		0	170,989,863	0	0	17,909,509	3,045,263
2083		0	152,089,646	0	0	15,382,287	2,544,675
2084		0	134,440,447	0	0	13,129,832	2,113,202
2085		0	118,084,942	0	0	11,136,064	1,743,749
2086		0	103,050,071	0	0	9,384,117	1,429,605
2087		0	89,340,729	0	0	7,856,020	1,164,383
2088		0	76,945,275	0	0	6,533,457	942,121
2089		0	65,831,310	0	0	5,397,610	757,243
2090		0	55,952,175	0	0	4,429,900	604,642
2091		0	47,245,283	0	0	3,611,964	479,643
2092		0	39,636,130	0	0	2,926,066	378,033
2093		0	33,042,988	0	0	2,355,484	296,071
2094		0	27,375,984	0	0	1,884,424	230,444
2095		0	22,543,174	0	0	1,498,414	178,274
2096		0	18,453,543	0	0	1,184,417	137,098
2097		0	15,016,190	0	0	930,663	104,807
2098		0	12,146,870	0	0	726,951	79,648
2099		0	9,768,256	0	0	564,502	60,173
2100		0	7,807,417	0	0	435,676	45,183
2101		0	6,200,202	0	0	334,095	33,709
2102		0	4,890,474	0	0	254,462	24,979
2103		0	3,829,203	0	0	192,393	18,374
2104		0	2,975,184	0	0	144,345	13,412
2105		0	2,290,322	0	0	107,298	9,700
2106		0	1,744,010	0	0	78,896	6,939
2107		0	1,311,977	0	0	57,311	4,904
2108		0	976,291	0	0	41,181	3,428
2109		0	716,440	0	0	29,182	2,363
2110		0	518,353	0	0	20,387	1,606
2111		0	365,716	0	0	13,890	1,065
2112		0	250,951	0	0	9,203	686
2113		0	169,808	0	0	6,013	436
2114		0	108,417	0	0	3,707	262
2115		0	65,582	0	0	2,166	149
2116		0	37,021	0	0	1,180	79
					\$ 4,809,392,271	\$ 1,477,883,076	\$ 6,287,275,347

Projection of Plan Net Position and Benefit Payments



SECTION H

GLOSSARY OF TERMS

Glossary of Terms

Actuarial Accrued Liability (AAL). The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal cost. Sometimes referred to as “accrued liability” or “past service liability.”

Actuarial Assumptions. Estimates of future plan experience such as investment return, expected lifetimes and the likelihood of receiving a pension from the Pension Plan. Demographic, or “people” assumptions, include rates of mortality, retirement and separation. Economic, or “money” assumptions, include expected investment return, inflation and salary increases.

Actuarial Cost Method. A mathematical budgeting procedure for allocating the dollar amount of the “actuarial present value of future plan benefits” between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the “actuarial funding method.”

Actuarial Present Value of Future Plan Benefits. The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

Actuarial Value of Assets (AVA). Smoothed value of assets that recognizes the difference between the expected investment return using the valuation assumption of 7.50 percent and the actual investment return over a five-year period. Dampens volatility of asset value over time.

Amortization. Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.

Annual Required Contribution. The sum of the normal cost and amortization of the unfunded actuarial accrued liability.

Asset Return. The net investment return for the asset divided by the mean asset value. Example: if \$1.00 is invested and yields \$1.08 after a year, the asset return is 8.00 percent.

Funded Ratio. The actuarial value of assets divided by the actuarial accrued liability. Measures the portion of the actuarial accrued liability that is currently funded.

Market Value of Assets (MVA). The value of assets currently held in the trust available to pay for benefits of the Pension Plan. Each of the investments in the trust is valued at market price which is the price at which buyers and sellers trade similar items in the open market.

Normal Cost (NC). The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as “current service cost.” Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.

Unfunded Actuarial Accrued Liability (UAAL). The difference between the actuarial accrued liability and valuation assets. Sometimes referred to as “unfunded accrued liability.”