



# West Virginia Teachers' Retirement System

## Actuarial Valuation As of July 1, 2014

February 2015



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West Virginia Consolidated Public Retirement Board  
4101 MacCorkle Avenue, SE  
Charleston, WV 25304

Retirement Board Members:

We respectfully present our report on the actuarial valuation of the West Virginia Teachers' Retirement System (TRS) as of July 1, 2014. This valuation presents the liabilities of the system as of the valuation date and the projected Employer contribution for fiscal year 2016.

Some key highlights are:

- The valuation was prepared based on an assumed interest rate of 7.5%.
- Based on the valuation results, the State contribution to TRS for fiscal year 2016 is \$387,685,000. The State appropriation needed for fiscal year 2016 for the Teachers' Retirement Plans (TRS and TDC) under the School Aid Formula is \$365,012,000.
- The funded percentage of system assets to the actuarial accrued liability at the valuation date is 66%, compared to 58% for the prior year.

This report contains supporting data and background information pertaining to the development of costs and related liabilities of the system. The valuation is based on membership data as of June 30, 2014 maintained by the West Virginia Consolidated Public Retirement Board and financial information received from the West Virginia Investment Management Board.

This report presents fairly the actuarial position of the West Virginia Teachers' Retirement System (TRS) as of July 1, 2014 in accordance with generally accepted actuarial principles applied on a basis consistent with that of the preceding valuation. In our opinion, the assumptions used in preparing the liabilities and costs are individually reasonable in respect to TRS experience and represent our best estimate of anticipated experience under TRS. The assumptions were developed in accordance with the guidance set forth in the various Actuarial Standards of Practice, including ASOP 27 and 35. In particular, the mortality assumptions were developed in accordance with the mandate that an appropriate margin for future improvement in mortality beyond the measurement date be included.

Future actuarial measurements may differ significantly from current measurements due to system experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in system provisions or applicable law. An analysis of the potential range of such future measurements is beyond the scope of this valuation.

The valuation results are based on liabilities used for funding purposes only. They do not reflect any changes under GASB 67 and 68, which are effective for fiscal years beginning after June 15, 2013, and June 15, 2014, respectively. The changes made under the new GASB standards only affect liabilities used for financial statement accounting disclosure purposes.

Use of this report for any other purpose may not be appropriate and may result in mistaken conclusions due to failure to understand applicable assumptions, methodologies, or inapplicability of the report for that purpose. Because of the risk of misinterpretation of actuarial results, you should ask Buck to review any statement you wish to make on the results contained in this report. Buck will not accept any liability for any such statement made without prior review by Buck.

I am a Fellow of the Society of Actuaries and a member of the American Academy of Actuaries. I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained in this report. This report has been prepared in accordance with all applicable Actuarial Standards of Practice, and I am available to answer questions about it.

Respectfully submitted,

A handwritten signature in black ink that reads "David L. Driscoll". The signature is written in a cursive, slightly slanted style.

David L. Driscoll, FSA, EA, MAAA, FCA  
Principal, Consulting Actuary

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# Section 1 – Summary of Valuation

This report presents the results of the July 1, 2014 actuarial valuation of the West Virginia Teachers' Retirement System and includes the projected employer contribution requirement for FY 2016. In addition, the report includes disclosure information under GASB 27. A summary of the system features, a summary of the method, factors and assumptions, and supplementary membership tables used in the valuation are also included.

## Valuation Results

The West Virginia Teachers' Retirement System (TRS) is a defined benefit plan covering education employees hired prior to July 1, 1991, or hired on and after July 1, 2005, and prior Teachers' Defined Contribution Plan (TDC) members who elected to transfer from TDC to TRS effective July 1, 2008 or August 1, 2008. The system provides unreduced monthly benefits to members upon retirement after 35 years of service, or at age 60 after completing 5 years of service. The system also provides reduced early retirement benefits, benefits in the event of disability or death while active, and deferred benefits to members who terminate prior to retirement, providing system eligibility conditions are met.

The system is funded through member contributions of 6% of payroll and employer contributions sufficient to provide for any remaining normal cost (after member contributions are accounted for) and to amortize the unfunded liability as a level-dollar amount starting from FY 2009.

The major purpose of this valuation is to determine the amount of appropriation needed for FY 2016 for West Virginia's Teachers Retirement Plans under the School Aid Formula (SAF), which is determined to be \$365,012,000. Two components of the SAF determination are calculated in the valuation process: the contributions required from the State for TRS, and a projection of the State's contributions to TDC, both for the FY 2016.

The State's contribution to TRS is based on an actuarial valuation of the provisions of the State code and the participant data, in consideration of the assets held in trust for TRS. The details of the TRS contribution for FY 2016 are shown in Table 1.

The State's TRS contribution for FY 2016, assuming a mid-year payment, consists of three separate components:

- The State share of the normal cost,
- The amount needed to fund the unfunded actuarial accrued liability, net of the liability for recent benefit changes, over a 40-year period which began in 1994 (as required by Section 18-9A-6a of the State code), and
- The amount required to separately amortize the liability for recent benefit changes. For FY 2016, there are no separate amortizations.

The total State TRS contribution on this basis is \$387,685,000.

Starting with FY 2009, the annual amortization payment toward the unfunded liability is determined as a level-dollar amount that is amortized over a 40-year period from July 1, 1994. In prior years, the amortization was determined as a level percentage of the projected total education payroll. The total amount contributed to the system from FY 2009 forward will fund the normal cost plus interest and principal on the unfunded liability, fully amortizing the unfunded liability by the end of FY 2034.

Table 2 presents the development of the School Aid Formula, separately identifying the TRS contribution based on the original 40-year amortization period, any special payments toward the additional unfunded due to recent system improvements, and other specific components. Detailed projections of the balance of the 40-year funding program under the level-dollar amortization schedule, net of any separately funded improvements, are shown in Tables 3 and 4.

## Section 1 – Summary of Valuation

The projected TDC contribution for FY 2016 for the School Aid Formula is based on projected payroll for that participant population. The split of both the TRS and the TDC contributions is based on information provided by the state Education Department. The projected fire insurance premium tax shown in Table 2 was provided by the Department of Administration.

### Comments on Valuation Results

Table 1 presents the development of the valuation results as of July 1, 2014 and, for comparison purposes, July 1, 2013. Based on the prior year's projections, the expected unfunded actuarial accrued liability as of July 1, 2014 was \$4.060 billion. The actual unfunded liability at the valuation date is \$3.417 billion, a decrease of \$0.643 billion.

The decrease in the unfunded liability was primarily due to the following:

- The return on assets for the year ending June 30, 2014 was approximately 17.5%. This return was well above the prior year's valuation assumption of 7.50% and decreased the unfunded liability by approximately \$624 million.
- Contributions less than expected increased the unfunded liability by approximately \$26 million.
- The combined impact of turnover, mortality, and retirement experience decreased the unfunded liability by approximately \$45 million.

Tables 3 and 4 present projections of the unfunded accrued liability, net of any separately funded liability, to June 30, 2034. Table 3 illustrates the expected pattern of change in the unfunded liability over the remaining 20-year period. The unfunded liability is expected to decrease steadily to zero at the end of the period. Table 4 presents the expected funding progress toward the unfunded actuarial accrued liability based on the funding policy. This table illustrates the expected dollar amount of change in this component of the unfunded liability from year to year.

Table 5 presents a cash flow projection of expected asset balances, contributions, disbursements, and earnings over the period to FY 2034.

The valuation results were determined using an interest rate of 7.5% with an underlying inflation assumption of 3.0%.

### Funding Progress

The information used to report on the funding status of the System for both the State's and the System's financial statements is presented in Table 6. This table presents information required under Governmental Accounting Standards Board Statement Number 27 (GASB 27).

### System Membership

A summary of system membership, with a comparison to the prior year, follows:

	July 1, 2014	July 1, 2013
Actives	35,724	35,593
Retirees & Beneficiaries	34,000	33,007
Terminated Vested	1,643	1,615
Terminated Non-Vested	2,506	2,256
Total	<u>73,873</u>	<u>72,471</u>

Table 9 presents a reconciliation of system membership during the year. Table 10 presents detailed information on the categories of system membership.

## Section 1 – Summary of Valuation

Tables 11(a) and 11(b) present the number and total annual compensation of actives, separately for Teachers and Non-Teachers (including State), by 5-year age and service groups as of July 1, 2014.

Table 12 presents the number and average monthly benefits of retirees and beneficiaries included in the valuation distributed by 5-year age groups. Table 13 shows a similar distribution for terminated vested participants entitled to deferred benefits.

# Section 1 – Summary of Valuation

**Table 1**  
**Development of Valuation Results**  
 (000's omitted)

Valuation Date	July 1, 2014	July 1, 2013
1. Present Value of Future Benefits		
a. Active	\$ 4,798,953	\$ 4,996,174
b. Inactive - Retirees	6,125,857	5,751,530
- Disabled Retirees	215,486	212,361
- Beneficiaries	216,893	206,797
- Vested Terminated	83,285	85,142
- Non-Vested Terminated	10,185	8,865
c. Total	\$ 11,450,659	\$ 11,260,869
2. Actuarial Accrued Liability	\$ 10,098,693	\$ 9,930,335
3. Assets (Market Value)	6,682,093	5,751,101
4. Unfunded Actuarial Accrued Liability (UAL)	\$ 3,416,600	\$ 4,179,234
5. Annual Normal Cost Rate: <b>Type 1 (Pre 7/1/1991 Group)</b>		
a. Present Value of Future Normal Costs	\$ 128,094	\$ 157,017
b. Present Value of Future Pay	\$ 1,260,917	\$ 1,562,953
c. Normal Cost Rate as a % of Payroll	10.16%	10.05%
d. Employee share	6.00%	6.00%
e. Employer share	4.16%	4.05%
f. TRS FY 2015 (2014) Normal Cost Payroll	\$ 316,189	\$ 380,830
g. Employer FY 2015 (2014) Normal Cost (BOY)	\$ 13,153	\$ 15,424
h. TRS FY 2016 (2015) Normal Cost Payroll	\$ 274,304	\$ 332,884
i. Employer FY 2016 (2015) Normal Cost (BOY)	\$ 11,411	\$ 13,482
6. Annual Normal Cost Rate: <b>Type 3 (Post 6/30/2005 Group)</b>		
a. Present Value of Future Normal Costs	\$ 1,223,872	\$ 1,173,517
b. Present Value of Future Pay	\$ 11,672,445	\$ 11,175,054
c. Normal Cost Rate as a % of Payroll	10.49%	10.50%
d. Employee share	6.00%	6.00%
e. Employer share	4.49%	4.50%
f. TRS FY 2015 (2014) Normal Cost Payroll	\$ 1,165,597	\$ 1,112,685
g. Employer FY 2015 (2014) Normal Cost (BOY)	\$ 52,335	\$ 50,071
h. TRS FY 2016 (2015) Normal Cost Payroll	\$ 1,261,421	\$ 1,214,459
i. Employer FY 2016 (2015) Normal Cost (BOY)	\$ 56,638	\$ 54,651



# Section 1 – Summary of Valuation

**Table 1 (continued)**  
**Development of Valuation Results**  
 (000's omitted)

Valuation Date	July 1, 2014	July 1, 2013
7. Employer Contribution for FY 2015 and FY 2016, (FY 2014 and FY 2015), assumes mid-year contribution:		
a. FY 2015 (2014)	FY 2015	FY 2014
i. TRS and TDC Payroll	\$ 1,623,963	\$ 1,635,480
ii. FY 2015 (2014) TRS Contribution		
A. Normal Cost	67,899	67,907
B. Amortization components:		
- Original UAL over 40 years as a level-dollar amount	323,239	387,076
C. Total	\$ 391,138	\$ 454,983
iii. FY 2015 (2014) Contribution as a % of Payroll	24.09%	27.82%
b. FY 2016 (2015)	FY 2016	FY 2015
i. TRS and TDC Payroll	\$ 1,675,930	\$ 1,687,816
ii. FY 2016 (2015) TRS Contribution		
A. Normal Cost	70,555	70,641
B. Amortization components:		
- Original UAL over 40 years as a level-dollar amount	317,130	384,080
C. Total	\$ 387,685	\$ 454,721
iii. FY 2016 (2015) Contribution as a % of Payroll	23.13%	26.94%
iv. FY 2016 (2015) SAF appropriation <sup>1</sup>	\$ 365,012	\$ 430,467
v. FY 2016 (2015) SAF appropriation as a % of Payroll	21.78%	25.50%

<sup>1</sup> The School Aid Formula retirement allocation includes the amount that the State appropriates for the Teachers Defined Contribution Plan and required payments toward the TRS Unfunded Actuarial Accrued Liabilities. It does NOT include amounts contributed to TRS by nonstate groups or the fire premium tax.

# Section 1 – Summary of Valuation

**Table 2**

**Development of School Aid Formula Appropriation for Fiscal Year 2016  
(000's omitted)**

TRS Contribution for FY 2016	\$ 387,685
+ 7.50% x School Aid Formula (TDC only) <sup>1</sup>	7,955
- 15.0% x County Portion of the Old Group TRS payroll <sup>2</sup>	(10,297)
- 7.5% x County Portion of the New Group TRS payroll <sup>3</sup>	(23,651)
- Fire Tax Per Code Section 33-3-14(d)	(2,644)
+ State payment equal to TDC forfeitures <sup>4</sup>	<u>5,964</u>
Subtotal of Standard SAF Appropriation	\$ 365,012
Special Payments for Benefit Improvements under H.B. 3145	<u>-</u>
Total FY 2016 SAF Appropriation	\$ 365,012

<sup>1</sup> School Aid Formula for TDC only is 74.53% of FY 2016 TDC pay for County employees plus FY 2016 TDC pay for State employees = 74.53% x \$134,052 + \$6,153 = 106,062.

<sup>2</sup> County portion of the Old Group TRS payroll is 25.47% of FY 2016 TRS pay for County employees = 25.47% x \$269,532 = \$68,650.

<sup>3</sup> County portion of the New Group TRS payroll is 25.47% of FY 2016 TRS pay for County employees = 25.47% x \$1,238,136 = \$315,353.

<sup>4</sup> Actual amount to be released from the TDC suspense account at 6/30/2014 per Code Section 18-7A-18a(b).

# Section 1 – Summary of Valuation

**Table 3**  
**Projection of Unfunded Accrued Liability and Annual Contributions**  
 (000's omitted)

FY Ending 6/30	Unfunded AAL BOY <sup>1</sup>	Employer Normal Cost (MOY) <sup>2</sup>			Projected Payroll			Total Type 1 Employer Contribution (MOY) <sup>3</sup>		Total Type 3 Employer Contribution (MOY)	
		Type 1	Type 3	Type 3	Type 1 TRS	Type 3 TRS	TRS+TDC	% of Payroll	Amount	% of Payroll	Amount
2015	\$ 3,416,600	\$ 13,978	\$ 56,663	\$ 316,189	\$ 1,165,597	\$ 1,623,963	24.51%	\$ 398,058	3.49%	\$ 56,663	
2016	3,274,622	11,831	58,724	274,304	1,261,421	1,675,930	19.63%	328,961	3.50%	58,724	
2017	3,191,411	10,298	62,991	238,760	1,353,087	1,729,560	18.93%	327,428	3.64%	62,991	
2018	3,101,959	8,850	67,270	205,183	1,445,011	1,784,906	18.26%	325,980	3.77%	67,270	
2019	3,005,799	7,466	71,581	173,110	1,537,619	1,842,023	17.62%	324,596	3.89%	71,581	
2020	2,902,427	6,213	75,848	144,037	1,629,257	1,900,967	17.01%	323,343	3.99%	75,848	
2021	2,791,302	5,079	80,105	117,757	1,720,718	1,961,798	16.42%	322,209	4.08%	80,105	
2022	2,671,842	4,112	84,287	95,334	1,810,566	2,024,576	15.87%	321,242	4.16%	84,287	
2023	2,543,423	3,279	88,439	76,045	1,899,733	2,089,362	15.34%	320,409	4.23%	88,439	
2024	2,405,372	2,582	92,554	59,845	1,988,139	2,156,222	14.83%	319,712	4.29%	92,554	
2025	2,258,968	2,003	96,660	46,448	2,076,318	2,225,221	14.34%	319,133	4.34%	96,660	
2026	2,097,433	1,543	100,752	35,764	2,164,231	2,296,428	13.88%	318,673	4.39%	100,752	
2027	1,925,933	1,167	104,874	27,079	2,252,757	2,369,914	13.43%	318,297	4.43%	104,874	
2028	1,741,571	873	109,007	20,236	2,341,561	2,445,751	13.00%	318,003	4.46%	109,007	
2029	1,543,381	644	113,197	14,928	2,431,555	2,524,015	12.59%	317,774	4.48%	113,197	
2030	1,330,327	474	117,443	10,980	2,522,769	2,604,783	12.19%	317,604	4.51%	117,443	
2031	1,101,294	346	121,778	8,036	2,615,887	2,688,136	11.81%	317,476	4.53%	121,778	
2032	855,084	254	126,196	5,881	2,710,790	2,774,157	11.44%	317,384	4.55%	126,196	
2033	590,408	185	130,724	4,290	2,808,033	2,862,930	11.08%	317,315	4.57%	130,724	
2034	305,881	138	135,358	3,189	2,907,584	2,954,544	10.74%	317,268	4.58%	135,358	

<sup>1</sup> Net of any separately funded liability for benefit increases.

<sup>2</sup> Net of member contributions.

<sup>3</sup> Net of any amortization amounts for separately funded benefit increases.

# Section 1 – Summary of Valuation

**Table 4**  
**Funding Progress of Unfunded Actuarial Accrued Liability Under Current Funding Policy**  
 (000's omitted)

FY Ending 6/30	Unfunded AAL BOY <sup>1</sup>	Interest on Unfunded at 7.50%	MOY Contribution Toward Unfunded <sup>2</sup>	Unfunded Funding Progress <sup>3</sup>
2015	\$ 3,416,600	\$ 256,245	\$ 384,080	\$ 141,978
2016	3,274,622	245,597	317,130	83,210
2017	3,191,411	239,356	317,130	89,451
2018	3,101,959	232,647	317,130	96,160
2019	3,005,799	225,435	317,130	103,372
2020	2,902,427	217,682	317,130	111,125
2021	2,791,302	209,348	317,130	119,459
2022	2,671,842	200,388	317,130	128,419
2023	2,543,423	190,757	317,130	138,050
2024	2,405,372	180,403	317,130	148,404
2025	2,256,968	169,273	317,130	159,534
2026	2,097,433	157,307	317,130	171,500
2027	1,925,933	144,445	317,130	184,362
2028	1,741,571	130,618	317,130	198,189
2029	1,543,381	115,754	317,130	213,053
2030	1,330,327	99,775	317,130	229,032
2031	1,101,294	82,597	317,130	246,210
2032	855,084	64,131	317,130	264,676
2033	590,408	44,281	317,130	284,526
2034	305,881	22,941	317,130	305,866

<sup>1</sup> Net of any separately funded liability for benefit increases.

<sup>2</sup> Net of employer contribution toward normal cost and any separately funded benefit increases.

<sup>3</sup> Equals (MOY Contribution) x 1.03682 - (Interest on Unfunded)

# Section 1 – Summary of Valuation

**Table 5**  
**Cash Flow Projection FY 2015 Through FY 2034**  
 (000's omitted)

FY Ending 6/30	Assets		Expected			Assets	
	Beg. of Year		Contributions	Benefits	Earnings	Net Income	End of Year
2015	\$ 6,682,093	\$	543,628	\$ 743,317	\$ 493,804	\$ 294,115	\$ 6,976,208
2016	6,976,208		479,829	760,002	512,899	232,726	7,208,934
2017	7,208,934		485,930	785,249	529,649	230,330	7,439,264
2018	7,439,264		492,262	809,442	546,266	229,086	7,668,350
2019	7,668,350		498,821	831,424	562,879	230,276	7,898,626
2020	7,898,626		505,589	851,637	579,655	233,607	8,132,233
2021	8,132,233		512,623	869,382	596,781	240,022	8,372,255
2022	8,372,255		519,883	884,266	614,502	250,119	8,622,374
2023	8,622,374		527,395	895,952	633,107	264,550	8,886,924
2024	8,886,924		535,145	905,194	652,893	282,844	9,169,768
2025	9,169,768		543,159	911,593	674,166	305,732	9,475,500
2026	9,475,500		551,425	916,132	697,233	332,526	9,808,026
2027	9,808,026		559,961	918,976	722,382	363,367	10,171,393
2028	10,171,393		568,718	920,046	749,918	398,590	10,569,983
2029	10,569,983		577,760	920,044	780,145	437,861	11,007,844
2030	11,007,844		587,072	918,711	813,377	481,738	11,489,582
2031	11,489,582		596,689	916,751	849,933	529,871	12,019,453
2032	12,019,453		606,580	914,361	890,126	582,345	12,601,798
2033	12,601,798		616,778	911,344	934,288	639,722	13,241,520
2034	13,241,520		627,272	907,134	982,809	702,947	13,944,467

# Section 1 – Summary of Valuation

**Table 6**

## **GASB 27 Supplementary Disclosure Information as of June 30, 2014**

Government Accounting Standards Board Statement 27 sets forth certain items of required supplementary information to be disclosed in financial statements of the System sponsor. The following information is intended to be used for this purpose in conjunction with other information prepared by the auditor.

### **1. Number of Members as of June 30, 2014 and June 30, 2013**

<b>Group</b>	<b>June 30, 2014</b>	<b>June 30, 2013</b>
Retirees, disabled retirees, and beneficiaries currently receiving benefits	34,000	33,007
Terminated employees entitled to benefits, but not yet receiving benefits	1,643	1,615
Terminated employees entitled to a return of employee contributions	2,506	2,256
Active System members		
Vested	25,203	25,403
Non-Vested	10,521	10,190
<b>Total</b>	<b>73,873</b>	<b>72,471</b>

### **2. Schedule of Funding Progress (000's omitted)**

<b>Actuarial Valuation Date</b>	<b>Actuarial Value of Assets (a)</b>	<b>Actuarial Accrued Liability (Entry Age) (b)</b>	<b>Unfunded Accrued Liability (UAL) (b - a)</b>	<b>Funded Ratio (a / b)</b>	<b>Covered Payroll (c)</b>	<b>UAL as a Percentage of Covered Payroll (b - a) / (c)</b>
6/30/04	\$1,427,475	\$6,440,738	\$5,013,263	22.2%	\$ 784,415	639.1%
6/30/05	1,627,355	6,617,708	4,990,353	24.6%	735,614	678.4%
6/30/06	2,174,464	6,877,872	4,703,408	31.6%	759,206	619.5%
6/30/07	3,665,993	7,142,711	3,476,718	51.3%	828,939	419.4%
6/30/08	4,133,883	8,268,578	4,134,695	50.0%	1,409,437	293.4%
6/30/09	3,554,771	8,607,869	5,053,098	41.3%	1,499,232	337.0%
6/30/10	4,143,540	8,904,312	4,760,772	46.5%	1,500,761	317.2%
6/30/11	5,074,665	9,445,148	4,370,483	53.7%	1,505,749	290.3%
6/30/12	5,144,397	9,712,582	4,568,185	53.0%	1,510,082	302.5%
6/30/13	5,751,101	9,930,335	4,179,234	57.9%	1,493,515	279.8%
6/30/14	6,682,093	10,098,693	3,416,600	66.2%	1,481,786	230.6%

# Section 1 – Summary of Valuation

Table 6 (continued)

GASB 27 Supplementary Disclosure Information as of June 30, 2014

3. The information presented in the required supplementary schedules was determined as part of the actuarial valuation at July 1, 2014. Additional information follows.

Valuation date	July 1, 2014
Actuarial cost method	Entry age
Amortization method	Level dollar amount
Remaining amortization period	20 years
Asset valuation method	Market value
Actuarial assumptions:	
Investment rate of return	7.50%
Projected salary increases:	
Teachers	3.75% - 5.25%
Non-Teachers	3.40% - 6.50%
Inflation rate	3.00%

## Section 1 – Summary of Valuation

**Table 7**  
**Valuation Assets as of June 30, 2014**  
(000's omitted)

	June 30, 2014	June 30, 2013
<b>Assets</b>		
Cash with State Treasurer	\$ 5	\$ 3
Investments at Fair Value	6,655,376	5,717,583
Contributions Receivable	23,063	28,320
Participant Loans Receivable	4,074	5,301
Miscellaneous Revenue Receivable	113	100
Total Assets	<u>\$ 6,682,631</u>	<u>\$ 5,751,307</u>
<b>Liabilities</b>		
Accrued Expenses and Other Payables	<u>538</u>	<u>206</u>
Net Assets for Pension Benefits	\$ 6,682,093	\$ 5,751,101



# Section 1 – Summary of Valuation

**Table 8**

**Statement of Changes in Net Assets for Benefits For Year ended June 30, 2014**  
(000's omitted)

Net Assets for Pension Benefits - Beginning of Year	\$	5,751,101
Post Valuation Adjustment		-
Net Assets for Pension Benefits - After Adjustment	\$	5,751,101
Additions:		
Contributions:		
Member Type 1	\$	21,636
Member Type 3		68,715
Employer Type 1		12,183
Employer Type 3		16,747
School Aid Formula		434,457
Make Up Contributions		-
Special Appropriations		-
Voluntary Special Contribution Members		-
Special Contribution Required Employers		-
Contribution Delinquency Fees		-
§33-3-14(d) Fees		2,644
Subtotal	\$	556,382
Investment Income:		
Net Appreciation in Fair Value <sup>1</sup>		1,002,752
Interest		429
Subtotal	\$	1,003,181
Other Income		52,252
Total	\$	1,611,815
Deductions and Transfers:		
Benefit Expense	\$	668,923
Refunds of Contributions		7,287
Administrative Expenses		4,348
TDC to TRS Accounts for Transfers		-
Transfers to/(from) other plans		265
Total	\$	680,823
Net Increase	\$	930,992
Net Assets for Pension Benefits - End of Year	\$	6,682,093
Investment Return for Year:		
Valuation purposes (assumes mid-year transactions and offsets investment income by investment and administrative expenses)		17.47%
Per Investment Management Board (time-weighted, excluding administrative expense)		17.85%

<sup>1</sup> Net of Investment Expense

## Section 1 – Summary of Valuation

**Table 9**  
**Reconciliation of Plan Participants**

	Active	Non-Vested Terms	Vested Terms	Service Retirees	Disabled Retirees	Beneficiaries	Total
Census as of July 1, 2013	35,593	2,256	1,615	28,354	2,206	2,447	72,471
New Entrants	2,757	76	-	-	-	208	3,041
Returned to Active Status	249	(205)	(44)	-	-	-	-
Terminated Non-Vested	(536)	536	-	-	-	-	-
Terminated Vested	(262)	(1)	263	-	-	-	-
Withdrew Contributions	(307)	(125)	(53)	-	-	-	(485)
Retired	(1,653)	(1)	(111)	1,765	-	-	-
Disabled	(70)	-	(10)	-	80	-	-
Deceased	(41)	(7)	(8)	(843)	(69)	(132)	(1,100)
Certain Period Expired	-	-	-	-	-	(10)	(10)
Adjustments	(6)	(23)	(9)	(2)	1	(5)	(44)
Census as of July 1, 2014	35,724	2,506	1,643	29,274	2,218	2,508	73,873

## Section 1 – Summary of Valuation

Table 10

Summary of Membership

	July 1, 2014 Valuation	July 1, 2013 Valuation
<b>Active Members:</b>		
Teachers	21,382	21,384
Non-Teachers (including State)	14,342	14,209
Total	<u>35,724</u>	<u>35,593</u>
<b>Inactive Members:</b>		
Service Retirees	29,274	28,354
Disabled Retirees	2,218	2,206
Beneficiaries	2,508	2,447
Vested Terminated	1,643	1,615
Non-Vested Terminated	2,506	2,256
Total	<u>38,419</u>	<u>36,878</u>
<b>Total Members</b>	73,873	72,471

# Section 1 – Summary of Valuation

**Table 11(a)**  
**Distribution of the Number and Total Annual Compensation of Active Teachers as of July 1, 2014**

Attained Age	Years of Credited Service													Total Count / Total Comp.		
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over							
	Count / Total Comp.	Count / Total Comp.	Count / Total Comp.	Count / Total Comp.	Count / Total Comp.	Count / Total Comp.	Count / Total Comp.	Count / Total Comp.	Count / Total Comp.	Count / Total Comp.	Count / Total Comp.	Count / Total Comp.				
Under 25	465															465
25 - 29	16,442,662															16,442,662
30 - 34	2,039	479	1													2,519
35 - 39	77,009,321	19,917,125	53,167	89	1											96,979,614
40 - 44	1,090	1,890	89	43,858	38											3,070
45 - 49	42,637,762	82,832,303	4,372,154	615	38											129,886,077
50 - 54	846	1,165	30,899,421	2,092,489	306											2,664
55 - 59	33,576,436	53,359,021	687	16,941,353	27											119,927,367
60 - 64	620	862	35,157,178	19,060,621	324	171										2,502
65 - 69	25,150,295	39,273,775	455	23,933,379	10,124,334	326	419									118,042,637
70 & over	16,691,123	29,642,221	23,816,894	12,926,780	19,345,696	46,426,173	26,907,286	41,189								2,418
Total	318	427	351	229	326	762	419	1								2,833
	207	338	319	287	255	444	661	384								2,896
	9,300,549	16,601,299	17,059,620	15,785,961	14,830,741	27,133,798	43,280,416	26,243,224	54,842							170,290,451
	124	174	211	181	137	225	171	313								1,661
	6,178,658	8,695,250	11,062,130	10,116,855	8,126,850	14,083,960	11,241,540	21,690,582	9,241,682							100,437,508
	34	43	39	27	16	50	24	19								301
	1,515,360	2,108,824	2,113,595	1,548,415	998,833	3,324,679	1,548,010	1,285,125	3,620,372							18,063,214
	5	9	2	3	7	8	2	2								53
	240,077	468,233	113,171	196,537	433,286	529,805	127,795	163,738	996,270							3,268,911
	6,152	6,022	2,769	1,501	1,092	1,660	1,277	719	190							21,382
Total	242,593,000	273,152,244	142,784,603	83,585,627	64,316,064	101,622,750	83,105,048	49,423,859	13,913,166							1,054,496,361

# Section 1 – Summary of Valuation

**Table 11(b)**  
**Distribution of the Number and Total Annual Compensation of Active Non-Teachers (Including State Employees) as of July 1, 2014**

Attained Age	Years of Credited Service														Total Count / Total Comp
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over						
	Count / Total Comp	Count / Total Comp	Count / Total Comp	Count / Total Comp	Count / Total Comp	Count / Total Comp	Count / Total Comp	Count / Total Comp	Count / Total Comp	Count / Total Comp	Count / Total Comp	Count / Total Comp	Count / Total Comp	Count / Total Comp	
Under 25	114 2,538,652														114 2,538,652
25 - 29	280 7,158,261	54 1,671,499													334 8,829,760
30 - 34	362 8,882,613	187 5,857,606	13 393,041												562 15,133,260
35 - 39	690 16,354,480	398 11,164,705	90 3,115,510	14 514,010											1,192 31,148,705
40 - 44	757 17,529,375	637 17,757,695	224 7,015,510	58 2,223,802	6 246,158	2 79,714									1,684 44,852,254
45 - 49	674 15,500,467	841 22,442,090	404 12,075,411	152 5,767,758	78 3,255,285	69 3,042,431	16 763,782								2,234 62,847,225
50 - 54	618 14,006,427	773 20,679,629	567 16,602,795	288 9,775,131	130 5,133,426	203 8,836,434	225 10,386,848	35 1,630,562							2,839 87,051,252
55 - 59	497 11,755,555	670 17,851,318	570 16,838,602	388 12,600,438	185 7,161,292	315 12,559,887	188 9,307,695	144 7,474,560	9 366,609						2,966 95,915,955
60 - 64	271 6,352,067	340 8,916,188	291 8,642,917	256 8,297,684	138 4,808,339	190 7,903,808	116 5,732,726	74 3,792,902	42 1,982,366						1,718 56,428,996
65 - 69	67 1,546,098	131 3,180,884	75 2,162,890	60 1,822,051	34 1,283,634	50 1,970,961	40 1,734,842	25 1,313,633	20 901,346						502 16,263,494
70 & over	46 988,126	28 783,485	20 507,452	15 400,118	12 451,470	28 1,010,950	8 300,124	20 901,346	20 937,228						197 6,280,299
Total	4,376 102,612,119	4,059 110,305,101	2,254 67,354,129	1,231 41,400,991	583 22,339,604	857 35,404,185	593 28,226,017	298 15,113,003	91 4,534,702						14,342 427,289,851

# Section 1 – Summary of Valuation

**Table 12**  
Distribution of the Number and Average Monthly Benefits of Retired Participants as of July 1, 2014

Current Age	Service Retirees			Disabled Retirees			Beneficiaries			Total		
	Count	Avg. Age	Avg. Mo. Benefit	Count	Avg. Age	Avg. Mo. Benefit	Count	Avg. Age	Avg. Mo. Benefit	Count	Avg. Age	Avg. Mo. Benefit
under 35	-	-	-	-	-	-	19	29	1,294	19	29	1,294
35 - 39	-	-	-	2	39	788	8	37	872	10	38	855
40 - 44	-	-	-	11	43	573	22	42	781	33	42	712
45 - 49	-	-	-	34	48	790	36	47	778	70	48	784
50 - 54	41	53	2,241	123	53	1,027	69	52	964	233	53	1,222
55 - 59	1,552	58	2,948	352	57	1,101	128	57	1,193	2,032	57	2,518
60 - 64	6,305	62	2,542	557	62	1,014	260	62	1,235	7,122	62	2,375
65 - 69	7,159	67	2,127	537	67	942	298	67	1,196	7,994	67	2,013
70 - 74	4,792	72	1,673	371	72	755	354	72	1,023	5,517	72	1,569
75 - 79	3,721	77	1,299	143	77	570	357	77	840	4,221	77	1,235
80 - 84	2,826	82	1,086	39	82	402	389	82	776	3,254	82	1,040
85 - 89	1,834	87	936	34	86	409	332	87	758	2,200	87	901
90 - 94	768	92	817	15	92	387	177	92	634	960	92	777
95 & over	276	97	672	-	-	-	59	97	505	335	97	642
Total	29,274	71	1,857	2,218	65	909	2,508	74	929	34,000	71	1,727
Total Annual Benefits			652,496,660			24,202,855			27,966,199			704,665,714

## Section 1 – Summary of Valuation

**Table 13**  
**Distribution of the Number and Average Monthly Benefits**  
**of Participants Entitled to Deferred Benefits as of July 1, 2014**

Current Age	Count	Deferred Vested	
		Avg. Age	Avg. Mo. Benefit
under 35	105	32	349
35 - 39	91	37	399
40 - 44	103	42	515
45 - 49	167	48	525
50 - 54	378	52	601
55 - 59	484	57	781
60 - 64	251	61	617
65 - 69	60	66	522
70 - 74	3	73	2,666
75 - 79	1	76	187
80 & over	-	-	-
Total	1,643	52	617
Total Annual Benefits			12,161,029

## Section 2 – Summary of System Provisions

- A. System Name:** The State Teachers' Retirement System (TRS)
- B. Effective Date:** Originally enacted effective July 1, 1941.
- C. Member:** Membership includes any employee hired before July 1991, or on or after July 1, 2005, in the public schools, state institutions of higher education, certain state departments, and the Board of Regents, and members of the Teachers' Defined Contribution Plan (TDC) who elected to transfer at July 1 or August 1, 2008. Other members of TDC or TIAA-CREF are not eligible for TRS.
- D. Final Average Salary:** Final Average Salary is the average of the Member's 5 highest fiscal years of total earnings from covered employment during the Member's last 15 years of service.
- E. Credited Service:** Credited Service is granted for each day the Member performs work and contributes to the System. At most one year of Credited Service may be earned in any one school year. Credited Service may be granted under certain guidelines for other State employment, for military service, and for out-of-state teaching service.
- 1. Contributory Service:** Service credited for years in which a Member contributes to the retirement system. Contributory service is counted for both eligibility and benefit determination.
  - 2. Military Service:** Active service in the U.S. military up to 25% of the amount of a Member's Contributory Service (but not more than 10 years) will be counted for both eligibility and benefit determination under the retirement system.
  - 3. Purchased Service:** Service in parochial school or with other states' teacher retirement systems may count for benefits (but not eligibility), provided that the Member pays TRS double the amount contributed during the first year of employment times the number of years credited plus interest, and cashes out his/her rights to any future benefits under his prior retirement system.
  - 4. Unused Leave:** A retiring member may choose to receive pension credited service for days of sick or annual leave unused at the time of retirement. Credited Service is granted at the rate of twice the actual number of unused days.
- F. Contributions**
- 1. Member Contributions:** Members contribute 6.0% of their pay to the retirement system.
  - 2. Employer Contributions:** The State of West Virginia and its counties contribute directly to TRS at the following rates:
    - The State contributes:
      - (1) 15.0% of the payroll of State-employed Members,
      - (2) 15.0% of School Aid Formula (SAF) covered payroll of county-employed Members,
      - (3) 7.5% of SAF-covered payroll of members of the TDC Plan,
      - (4) a certain percentage of fire insurance premiums paid by state residents, and
      - (5) under Code Section 18-9-A-6a, beginning in fiscal year 1996, an amount determined by the State Actuary as being needed to eliminate the TRS Unfunded Liability within 40 years of June 30, 1994.



## Section 2 – Summary of System Provisions

- Counties contribute 15.0% of the payroll of TRS Members hired before July 1, 1991 and 7.5% of the payroll for TRS Members hired on or after July 1, 2005, and prior TDC members who transferred into TRS at July 1, 2008 or August 1, 2008, who are employed by county boards of education, which is not covered under the School Aid Formula.

### G. Service Retirement

1. **Eligibility:** A Member may retire with an unreduced pension (1) at any age with 35 years of Credited Service, or (2) at age 60 with 5 years of Credited Service. A member may retire with 30 years of Credited Service at any age, with the pension reduced actuarially if the Member retires before age 55.
2. **Benefit:** The normal form of benefit is a single life annuity paid monthly, in an amount equal to 2% of Final Average Salary times years of Credited Service. Other forms of benefit may be elected, subject to actuarial reduction, including a Cash Refund Annuity, 50% or 100% Joint and Survivor Annuities, and a 10-Year Certain and Life Annuity.

### H. Disability Retirement

1. **Eligibility:** A Member may be eligible to receive a disability retirement benefit after completing 10 years of Credited Service, if the Member is disabled for 6 months, unable to perform his or her regular occupation and the Retirement Board expects the disability to be permanent.
2. **Benefit:** An annual disability benefit amount, payable monthly as a Cash Refund Annuity, is equal to 2% of the Member's Final Average Salary times the total years of Credited Service to date of disability.

### I. Pre-Retirement Death Benefits

1. **Eligibility:** The surviving spouse of a deceased Member who had attained age 50 and completed 25 years of Credited Service is eligible for the Surviving Spouse Benefit. If a member dies prior to attaining age 50 or completing 25 years of Credited Service a Lump Sum Death Benefit is payable to the beneficiary.
2. **Benefit:**
  - **Surviving Spouse Benefit:** The surviving spouse receives an annuity payable as if the Member had retired on the date of death with a 100% Joint and Survivor pension.
  - **Lump Sum Death Benefit:** The sum of the accumulated Member contributions with interest and accumulated Member contributions without interest is paid to the Member's beneficiary (or estate).

### J. Refund of Contributions

1. **Eligibility:** A Member who leaves employment and is not eligible for any other benefit will receive a refund of his or her contributions to the retirement system.
2. **Benefit:** A lump sum of the Member's accumulated contributions, with compound interest computed on any contributed amount from the end of the fiscal year in which contributed to the date of distribution of the lump sum (but in no case beyond 5 years after the end of the fiscal year during which the Member left service). For purposes of this benefit, interest is computed at a 4% annual rate.

## Section 2 – Summary of System Provisions

### K. Deferred Vested Benefit

1. **Eligibility:** A Member leaving employment with 5 years of Contributory Service may elect to receive either a refund of contributions or a deferred pension commencing at age 62. If a Member has 20 years of Contributory Service, the deferral age is age 60.
2. **Benefit:** An annuity defined as described under “Service Retirement.”

### L. Post-Retirement Cost-of-Living Adjustments

*Ad hoc* cost-of-living increases in pensions are periodically granted by the State Legislature. However, the retirement system makes no automatic provision for such increases.

Effective July 1, 2001 retirees age 65 and over who were retired for at least 5 years received a percentage increase in benefits as follows:

- Eligible retirees age 65 to age 70 received a 5% increase, and
- Eligible retirees over age 70 received a 10% increase.

However, if the retiree originally retired under an early retirement window the percentage increase was limited to 3%.

Effective July 1, 2006, retirees age 70 and over who were retired for at least 5 years received a 3% increase in retirement benefits.

Effective July 1, 2008, all retirees and applicable beneficiaries thereof who retired with 20 or more years of service and are receiving a primary retiree pension of \$600 or less per month received a thirteenth check single payment of \$600.

Effective July 1, 2011, a select group of retirees received a thirteenth check single payment of \$1200.

## Section 3 – Actuarial Assumptions and Methods

### A. Valuation Date

July 1, 2014

### B. Funding Method and Basis for Assumptions

The valuation is prepared under the Entry Age Cost Method with individually computed accrued liabilities. The Normal Cost is computed in aggregate. Entry is based on adjusted date of hire (i.e. valuation date minus known past service).

Experience studies are performed at least once in every five-year period. This valuation was prepared on the basis of assumptions that were recommended to and adopted by the Board on the basis of an experience study covering the period from July 1, 2005, to June 30, 2010. These assumptions will remain in effect for valuation purposes until such time as the Board adopts revised assumptions.

### C. Interest Rate and Expenses

The valuation interest assumption is 7.5 % per annum, with no loading for system expenses.

### D. Pre-Retirement Mortality

Pre-retirement mortality rates are shown in the Appendix and are based on the results of the 2006-2010 experience study. The mortality tables are as follows:

In service males: RP-2000 Non-Annuitant table

In service females: RP-2000 Non-Annuitant table

### E. Post-Retirement Mortality

Post-retirement mortality rates are shown in the Appendix and are based on the results of the 2006-2010 experience study. The mortality tables are as follows:

Healthy males: RP-2000 Healthy Annuitant table, projected to 2020

Healthy females: RP-2000 Healthy Annuitant table, projected to 2020

Disabled males: RP-2000 Disabled Annuitant table, projected to 2020, setback 2 years

Disabled females: RP-2000 Disabled Annuitant table, projected to 2020, setback 1 year

### F. Withdrawal from Service

Withdrawal rates are shown in the Appendix and are based on the 2006-2010 experience study. Withdrawal rates are assumed to cease upon eligibility for retirement. All withdrawal is assumed to result in refund of contributions if non-vested or a deferred annuity if vested.

### G. Disablement Rates

Disablement rates are shown in the Appendix and are based on the 2006-2010 experience study.

### H. Retirement Rates

Retirement rates are shown in the Appendix and are based on the 2006-2010 experience study.

## Section 3 – Actuarial Assumptions and Methods

### I. Salary Scales

Salary scales are shown in the Appendix and are based on the 2006-2010 experience study. Projected salary increases are in the following ranges by group, with an underlying inflation rate of 3.0%:

Group	Range of Projected Salary Increases
Teachers	3.75% - 5.25%
Non-Teachers	3.40% - 6.50%

### J. Accrual of Future Service

Future service accrual factors are based on the 2006-2010 experience study. All active members will accrue 1.00 year of service for each future year of employment.

### K. Non-Contributory Service Loadings

The load factor assumptions for non-contributory service (military, parochial or out-of-state teaching, transferred PERS service, and unused sick leave) are based on the 2006-2010 experience study and are as follows:

Group	Male	Female
Teachers	1.0750	1.0400
Non-Teachers	1.0400	1.0275

### L. Family Composition

It is assumed that 85% of males and 80% of females are married, with husbands 3 years older than wives. Remarriage rates are not used.

### M. Asset Valuation Method

Assets for valuation purposes are included at Market Value.

### N. System Contribution

System Contributions, both employee and employer, are assumed to be paid in the middle of the year.

# Appendix – Detailed Assumptions

## Pre-Retirement Mortality

### RP-2000 Non-Annuitant Table

Age	Male	Female	Age	Male	Female
19	0.00033	0.00019	45	0.00151	0.00112
20	0.00035	0.00019	46	0.00162	0.00122
21	0.00036	0.00019	47	0.00173	0.00133
22	0.00037	0.00019	48	0.00186	0.00143
23	0.00037	0.00020	49	0.00200	0.00155
24	0.00038	0.00020	50	0.00214	0.00168
25	0.00038	0.00021	51	0.00229	0.00181
26	0.00038	0.00021	52	0.00245	0.00197
27	0.00038	0.00022	53	0.00262	0.00214
28	0.00039	0.00024	54	0.00281	0.00232
29	0.00041	0.00025	55	0.00303	0.00253
30	0.00044	0.00026	56	0.00331	0.00276
31	0.00050	0.00031	57	0.00363	0.00301
32	0.00056	0.00035	58	0.00400	0.00329
33	0.00063	0.00039	59	0.00441	0.00360
34	0.00070	0.00044	60	0.00488	0.00393
35	0.00077	0.00048	61	0.00538	0.00429
36	0.00084	0.00051	62	0.00592	0.00466
37	0.00090	0.00055	63	0.00647	0.00504
38	0.00096	0.00060	64	0.00703	0.00543
39	0.00102	0.00065	65	0.00757	0.00582
40	0.00108	0.00071	66	0.00810	0.00621
41	0.00114	0.00077	67	0.00860	0.00658
42	0.00122	0.00085	68	0.00907	0.00695
43	0.00130	0.00094	69	0.00951	0.00729
44	0.00140	0.00103	70	0.00992	0.00761
			71	0.00000	0.00000

# Appendix – Detailed Assumptions

## Post-Retirement Healthy Mortality

### RP-2000 Healthy Annuitant Table Projected to 2020 with Scale AA

Age	Male	Female	Age	Male	Female
49	0.00000	0.00000	85	0.09624	0.06866
50	0.00372	0.00166	86	0.10670	0.07814
51	0.00377	0.00178	87	0.12062	0.08892
52	0.00377	0.00200	88	0.13623	0.09904
53	0.00382	0.00227	89	0.15055	0.11221
54	0.00387	0.00261	90	0.16928	0.12400
55	0.00402	0.00301	91	0.18438	0.13617
56	0.00426	0.00348	92	0.20397	0.14843
57	0.00457	0.00397	93	0.22004	0.16374
58	0.00499	0.00445	94	0.23607	0.17562
59	0.00542	0.00500	95	0.25699	0.18688
60	0.00594	0.00561	96	0.27276	0.19732
61	0.00665	0.00626	97	0.28808	0.21098
62	0.00733	0.00696	98	0.30905	0.21951
63	0.00826	0.00770	99	0.32367	0.22680
64	0.00914	0.00850	100	0.33773	0.23276
65	0.01012	0.00938	101	0.35863	0.24483
66	0.01144	0.01032	102	0.37169	0.25450
67	0.01267	0.01134	103	0.38304	0.26604
68	0.01373	0.01246	104	0.39200	0.27906
69	0.01517	0.01371	105	0.39789	0.29312
70	0.01641	0.01515	106	0.40000	0.30781
71	0.01816	0.01647	107	0.40000	0.32273
72	0.02016	0.01832	108	0.40000	0.33744
73	0.02246	0.01996	109	0.40000	0.35154
74	0.02506	0.02212	110	0.40000	0.36462
75	0.02854	0.02394	111	0.40000	0.37625
76	0.03181	0.02637	112	0.40000	0.38602
77	0.03611	0.02964	113	0.40000	0.39351
78	0.04094	0.03267	114	0.40000	0.39831
79	0.04643	0.03607	115	0.40000	0.40000
80	0.05265	0.03987	116	0.40000	0.40000
81	0.06013	0.04412	117	0.40000	0.40000
82	0.06854	0.04892	118	0.40000	0.40000
83	0.07640	0.05431	119	0.40000	0.40000
84	0.08670	0.06041	120	1.00000	1.00000

# Appendix – Detailed Assumptions

## Post-Retirement Disabled Mortality

RP-2000 Disabled Annuitant Table, Projected to 2020 with Scale AA  
Set Back 2 Years for Males and Set Back 1 Year for Females

Age	Male	Female	Age	Male	Female	Age	Male	Female
21	0.00000	0.00000	54	0.02107	0.01136	87	0.12304	0.09688
22	0.01570	0.00529	55	0.02194	0.01268	88	0.12893	0.10569
23	0.01570	0.00529	56	0.02280	0.01409	89	0.13763	0.11303
24	0.01602	0.00540	57	0.02415	0.01560	90	0.14672	0.12333
25	0.01668	0.00551	58	0.02554	0.01688	91	0.15309	0.13188
26	0.01737	0.00562	59	0.02699	0.01783	92	0.16928	0.14097
27	0.01846	0.00585	60	0.02849	0.01879	93	0.18438	0.15060
28	0.02001	0.00585	61	0.02946	0.01976	94	0.20397	0.16374
29	0.02042	0.00585	62	0.03045	0.02075	95	0.22004	0.17562
30	0.02042	0.00585	63	0.03213	0.02178	96	0.23607	0.18688
31	0.02042	0.00609	64	0.03325	0.02288	97	0.25699	0.19732
32	0.02042	0.00634	65	0.03514	0.02406	98	0.27276	0.21098
33	0.02042	0.00634	66	0.03644	0.02535	99	0.28808	0.21951
34	0.02042	0.00622	67	0.03785	0.02677	100	0.30905	0.22680
35	0.02042	0.00609	68	0.04019	0.02834	101	0.32367	0.23276
36	0.02042	0.00597	69	0.04191	0.03006	102	0.33773	0.24483
37	0.02042	0.00585	70	0.04293	0.03196	103	0.35863	0.25450
38	0.02042	0.00574	71	0.04497	0.03405	104	0.37169	0.26604
39	0.02042	0.00562	72	0.04626	0.03559	105	0.38304	0.27906
40	0.02001	0.00551	73	0.04867	0.03799	106	0.39200	0.29312
41	0.01961	0.00551	74	0.05130	0.03977	107	0.39789	0.30781
42	0.01922	0.00551	75	0.05417	0.04249	108	0.40000	0.32273
43	0.01884	0.00551	76	0.05729	0.04448	109	0.40000	0.33744
44	0.01846	0.00551	77	0.06190	0.04750	110	0.40000	0.35154
45	0.01809	0.00551	78	0.06559	0.05174	111	0.40000	0.36462
46	0.01773	0.00540	79	0.07093	0.05522	112	0.40000	0.37625
47	0.01737	0.00581	80	0.07670	0.05891	113	0.40000	0.38602
48	0.01799	0.00623	81	0.08287	0.06283	114	0.40000	0.39351
49	0.01857	0.00680	82	0.08946	0.06703	115	0.40000	0.39831
50	0.01912	0.00740	83	0.09643	0.07151	116	0.40000	0.40000
51	0.01965	0.00819	84	0.10379	0.07633	117	0.40000	0.40000
52	0.02015	0.00904	85	0.10930	0.08150	118	0.40000	0.40000
53	0.02062	0.01015	86	0.11724	0.08884	119	0.40000	0.40000
						120	1.00000	1.00000

## Appendix – Detailed Assumptions

### Withdrawal Rates Teachers (less than 1 year)

Age	Male	Female	Age	Male	Female	Age	Male	Female
19	0.30000	0.30000	36	0.23600	0.23600	53	0.16800	0.16800
20	0.30000	0.30000	37	0.23200	0.23200	54	0.16400	0.16400
21	0.29600	0.29600	38	0.22800	0.22800	55	0.16000	0.16000
22	0.29200	0.29200	39	0.22400	0.22400	56	0.15600	0.15600
23	0.28800	0.28800	40	0.22000	0.22000	57	0.15200	0.15200
24	0.28400	0.28400	41	0.21600	0.21600	58	0.14800	0.14800
25	0.28000	0.28000	42	0.21200	0.21200	59	0.14400	0.14400
26	0.27600	0.27600	43	0.20800	0.20800	60	0.14000	0.14000
27	0.27200	0.27200	44	0.20400	0.20400	61	0.14000	0.14000
28	0.26800	0.26800	45	0.20000	0.20000	62	0.14000	0.14000
29	0.26400	0.26400	46	0.19600	0.19600	63	0.14000	0.14000
30	0.26000	0.26000	47	0.19200	0.19200	64	0.14000	0.14000
31	0.25600	0.25600	48	0.18800	0.18800	65	0.14000	0.14000
32	0.25200	0.25200	49	0.18400	0.18400	66	0.14000	0.14000
33	0.24800	0.24800	50	0.18000	0.18000	67	0.14000	0.14000
34	0.24400	0.24400	51	0.17600	0.17600	68	0.14000	0.14000
35	0.24000	0.24000	52	0.17200	0.17200	69	0.14000	0.14000

### Withdrawal Rates Teachers (1 to 2 years)

Age	Male	Female	Age	Male	Female	Age	Male	Female
19	0.14300	0.13000	36	0.10560	0.09600	53	0.06600	0.06000
20	0.14300	0.13000	37	0.10120	0.09200	54	0.06600	0.06000
21	0.14080	0.12800	38	0.09680	0.08800	55	0.06600	0.06000
22	0.13860	0.12600	39	0.09240	0.08400	56	0.06380	0.05800
23	0.13640	0.12400	40	0.08800	0.08000	57	0.06160	0.05600
24	0.13420	0.12200	41	0.08580	0.07800	58	0.05940	0.05400
25	0.13200	0.12000	42	0.08360	0.07600	59	0.05720	0.05200
26	0.12980	0.11800	43	0.08140	0.07400	60	0.05500	0.05000
27	0.12760	0.11600	44	0.07920	0.07200	61	0.05500	0.05000
28	0.12540	0.11400	45	0.07700	0.07000	62	0.05500	0.05000
29	0.12320	0.11200	46	0.07480	0.06800	63	0.05500	0.05000
30	0.12100	0.11000	47	0.07260	0.06600	64	0.05500	0.05000
31	0.11880	0.10800	48	0.07040	0.06400	65	0.05500	0.05000
32	0.11660	0.10600	49	0.06820	0.06200	66	0.05500	0.05000
33	0.11440	0.10400	50	0.06600	0.06000	67	0.05500	0.05000
34	0.11220	0.10200	51	0.06600	0.06000	68	0.05500	0.05000
35	0.11000	0.10000	52	0.06600	0.06000	69	0.05500	0.05000



## Appendix – Detailed Assumptions

### Withdrawal Rates Teachers (2 to 3 years)

Age	Male	Female	Age	Male	Female	Age	Male	Female
19	0.10000	0.10000	36	0.06550	0.06200	53	0.05400	0.04000
20	0.10000	0.10000	37	0.06500	0.06000	54	0.05300	0.04000
21	0.10000	0.10000	38	0.06450	0.05800	55	0.05200	0.04000
22	0.10000	0.10000	39	0.06400	0.05600	56	0.05100	0.04000
23	0.09400	0.09600	40	0.06350	0.05400	57	0.05000	0.04000
24	0.08800	0.09200	41	0.06300	0.05200	58	0.05000	0.04000
25	0.08200	0.08800	42	0.06250	0.05000	59	0.05000	0.04000
26	0.07600	0.08400	43	0.06200	0.04800	60	0.05000	0.04000
27	0.07000	0.08000	44	0.06150	0.04600	61	0.05000	0.04000
28	0.06950	0.07800	45	0.06100	0.04400	62	0.05000	0.04000
29	0.06900	0.07600	46	0.06050	0.04200	63	0.05000	0.04000
30	0.06850	0.07400	47	0.06000	0.04000	64	0.05000	0.04000
31	0.06800	0.07200	48	0.05900	0.04000	65	0.05000	0.04000
32	0.06750	0.07000	49	0.05800	0.04000	66	0.05000	0.04000
33	0.06700	0.06800	50	0.05700	0.04000	67	0.05000	0.04000
34	0.06650	0.06600	51	0.05600	0.04000	68	0.05000	0.04000
35	0.06600	0.06400	52	0.05500	0.04000	69	0.05000	0.04000

### Withdrawal Rates Teachers (3 to 4 years)

Age	Male	Female	Age	Male	Female	Age	Male	Female
19	0.08000	0.08000	36	0.05200	0.03680	53	0.03000	0.03000
20	0.08000	0.08000	37	0.04900	0.03600	54	0.03000	0.03000
21	0.08000	0.08000	38	0.04600	0.03600	55	0.03000	0.03000
22	0.08000	0.08000	39	0.04300	0.03600	56	0.03000	0.03000
23	0.08000	0.07600	40	0.04000	0.03600	57	0.03000	0.03000
24	0.08000	0.07200	41	0.03800	0.03600	58	0.03000	0.03000
25	0.08000	0.06800	42	0.03600	0.03600	59	0.03000	0.03000
26	0.07600	0.06400	43	0.03400	0.03400	60	0.03000	0.03000
27	0.07200	0.06000	44	0.03200	0.03200	61	0.03000	0.03000
28	0.06800	0.05600	45	0.03000	0.03000	62	0.03000	0.03000
29	0.06400	0.05200	46	0.03000	0.03000	63	0.03000	0.03000
30	0.06000	0.04800	47	0.03000	0.03000	64	0.03000	0.03000
31	0.05900	0.04400	48	0.03000	0.03000	65	0.03000	0.03000
32	0.05800	0.04000	49	0.03000	0.03000	66	0.03000	0.03000
33	0.05700	0.03920	50	0.03000	0.03000	67	0.03000	0.03000
34	0.05600	0.03840	51	0.03000	0.03000	68	0.03000	0.03000
35	0.05500	0.03760	52	0.03000	0.03000	69	0.03000	0.03000

## Appendix – Detailed Assumptions

### Withdrawal Rates Teachers (4 to 5 years)

Age	Male	Female	Age	Male	Female	Age	Male	Female
19	0.06000	0.04000	36	0.03200	0.02800	53	0.01500	0.01500
20	0.06000	0.04000	37	0.02900	0.02667	54	0.01500	0.01500
21	0.06000	0.04000	38	0.02600	0.02533	55	0.01500	0.01500
22	0.06000	0.04000	39	0.02300	0.02400	56	0.01500	0.01500
23	0.06000	0.04000	40	0.02000	0.02267	57	0.01500	0.01500
24	0.06000	0.04000	41	0.02000	0.02133	58	0.01500	0.01500
25	0.06000	0.04000	42	0.02000	0.02000	59	0.01500	0.01500
26	0.05600	0.04000	43	0.02000	0.02000	60	0.01500	0.01500
27	0.05200	0.04000	44	0.02000	0.02000	61	0.01500	0.01500
28	0.04800	0.03867	45	0.02000	0.02000	62	0.01500	0.01500
29	0.04400	0.03733	46	0.01900	0.01900	63	0.01500	0.01500
30	0.04000	0.03600	47	0.01800	0.01800	64	0.01500	0.01500
31	0.03900	0.03467	48	0.01700	0.01700	65	0.01500	0.01500
32	0.03800	0.03333	49	0.01600	0.01600	66	0.01500	0.01500
33	0.03700	0.03200	50	0.01500	0.01500	67	0.01500	0.01500
34	0.03600	0.03067	51	0.01500	0.01500	68	0.01500	0.01500
35	0.03500	0.02933	52	0.01500	0.01500	69	0.01500	0.01500

### Withdrawal Rates Teachers (greater than 5 years)

Age	Male	Female	Age	Male	Female	Age	Male	Female
19	0.03200	0.03200	36	0.02141	0.01920	53	0.01440	0.01040
20	0.03200	0.03200	37	0.02082	0.01840	54	0.01520	0.01120
21	0.03120	0.03120	38	0.02022	0.01760	55	0.01600	0.01200
22	0.03040	0.03040	39	0.01963	0.01680	56	0.01600	0.01200
23	0.02960	0.02960	40	0.01904	0.01600	57	0.01600	0.01200
24	0.02880	0.02880	41	0.01843	0.01520	58	0.01600	0.01200
25	0.02800	0.02800	42	0.01782	0.01440	59	0.01600	0.01200
26	0.02720	0.02720	43	0.01722	0.01360	60	0.01600	0.01200
27	0.02640	0.02640	44	0.01661	0.01280	61	0.01600	0.01200
28	0.02560	0.02560	45	0.01600	0.01200	62	0.01600	0.01200
29	0.02480	0.02480	46	0.01520	0.01120	63	0.01600	0.01200
30	0.02400	0.02400	47	0.01440	0.01040	64	0.01600	0.01200
31	0.02360	0.02320	48	0.01360	0.00960	65	0.01600	0.01200
32	0.02320	0.02240	49	0.01280	0.00880	66	0.01600	0.01200
33	0.02280	0.02160	50	0.01200	0.00800	67	0.01600	0.01200
34	0.02240	0.02080	51	0.01280	0.00880	68	0.01600	0.01200
35	0.02200	0.02000	52	0.01360	0.00960	69	0.01600	0.01200

# Appendix – Detailed Assumptions

## Withdrawal Rates Non-Teachers and State (less than 1 year)

Age	Male	Female	Age	Male	Female	Age	Male	Female
19	0.22500	0.22500	36	0.17700	0.17700	53	0.12600	0.12600
20	0.22500	0.22500	37	0.17400	0.17400	54	0.12300	0.12300
21	0.22200	0.22200	38	0.17100	0.17100	55	0.12000	0.12000
22	0.21900	0.21900	39	0.16800	0.16800	56	0.11700	0.11700
23	0.21600	0.21600	40	0.16500	0.16500	57	0.11400	0.11400
24	0.21300	0.21300	41	0.16200	0.16200	58	0.11100	0.11100
25	0.21000	0.21000	42	0.15900	0.15900	59	0.10800	0.10800
26	0.20700	0.20700	43	0.15600	0.15600	60	0.10500	0.10500
27	0.20400	0.20400	44	0.15300	0.15300	61	0.10500	0.10500
28	0.20100	0.20100	45	0.15000	0.15000	62	0.10500	0.10500
29	0.19800	0.19800	46	0.14700	0.14700	63	0.10500	0.10500
30	0.19500	0.19500	47	0.14400	0.14400	64	0.10500	0.10500
31	0.19200	0.19200	48	0.14100	0.14100	65	0.10500	0.10500
32	0.18900	0.18900	49	0.13800	0.13800	66	0.10500	0.10500
33	0.18600	0.18600	50	0.13500	0.13500	67	0.10500	0.10500
34	0.18300	0.18300	51	0.13200	0.13200	68	0.10500	0.10500
35	0.18000	0.18000	52	0.12900	0.12900	69	0.10500	0.10500

## Withdrawal Rates Non-Teachers and State (1 to 2 years)

Age	Male	Female	Age	Male	Female	Age	Male	Female
19	0.13000	0.11700	36	0.09600	0.08640	53	0.06000	0.05400
20	0.13000	0.11700	37	0.09200	0.08280	54	0.06000	0.05400
21	0.12800	0.11520	38	0.08800	0.07920	55	0.06000	0.05400
22	0.12600	0.11340	39	0.08400	0.07560	56	0.05800	0.05220
23	0.12400	0.11160	40	0.08000	0.07200	57	0.05600	0.05040
24	0.12200	0.10980	41	0.07800	0.07020	58	0.05400	0.04860
25	0.12000	0.10800	42	0.07600	0.06840	59	0.05200	0.04680
26	0.11800	0.10620	43	0.07400	0.06660	60	0.05000	0.04500
27	0.11600	0.10440	44	0.07200	0.06480	61	0.05000	0.04500
28	0.11400	0.10260	45	0.07000	0.06300	62	0.05000	0.04500
29	0.11200	0.10080	46	0.06800	0.06120	63	0.05000	0.04500
30	0.11000	0.09900	47	0.06600	0.05940	64	0.05000	0.04500
31	0.10800	0.09720	48	0.06400	0.05760	65	0.05000	0.04500
32	0.10600	0.09540	49	0.06200	0.05580	66	0.05000	0.04500
33	0.10400	0.09360	50	0.06000	0.05400	67	0.05000	0.04500
34	0.10200	0.09180	51	0.06000	0.05400	68	0.05000	0.04500
35	0.10000	0.09000	52	0.06000	0.05400	69	0.05000	0.04500

## Appendix – Detailed Assumptions

### Withdrawal Rates Non-Teachers and State (2 to 3 years)

Age	Male	Female	Age	Male	Female	Age	Male	Female
19	0.10000	0.08000	36	0.06700	0.05360	53	0.04000	0.03200
20	0.10000	0.08000	37	0.06400	0.05120	54	0.04000	0.03200
21	0.10000	0.08000	38	0.06100	0.04880	55	0.04000	0.03200
22	0.10000	0.08000	39	0.05800	0.04640	56	0.04000	0.03200
23	0.10000	0.08000	40	0.05500	0.04400	57	0.04000	0.03200
24	0.10000	0.08000	41	0.05200	0.04160	58	0.04000	0.03200
25	0.10000	0.08000	42	0.04900	0.03920	59	0.04000	0.03200
26	0.09700	0.07760	43	0.04600	0.03680	60	0.04000	0.03200
27	0.09400	0.07520	44	0.04300	0.03440	61	0.04000	0.03200
28	0.09100	0.07280	45	0.04000	0.03200	62	0.04000	0.03200
29	0.08800	0.07040	46	0.04000	0.03200	63	0.04000	0.03200
30	0.08500	0.06800	47	0.04000	0.03200	64	0.04000	0.03200
31	0.08200	0.06560	48	0.04000	0.03200	65	0.04000	0.03200
32	0.07900	0.06320	49	0.04000	0.03200	66	0.04000	0.03200
33	0.07600	0.06080	50	0.04000	0.03200	67	0.04000	0.03200
34	0.07300	0.05840	51	0.04000	0.03200	68	0.04000	0.03200
35	0.07000	0.05600	52	0.04000	0.03200	69	0.04000	0.03200

### Withdrawal Rates Non-Teachers and State (3 to 4 years)

Age	Male	Female	Age	Male	Female	Age	Male	Female
19	0.08000	0.07200	36	0.05200	0.04680	53	0.03000	0.02700
20	0.08000	0.07200	37	0.04900	0.04410	54	0.03000	0.02700
21	0.08000	0.07200	38	0.04600	0.04140	55	0.03000	0.02700
22	0.08000	0.07200	39	0.04300	0.03870	56	0.03000	0.02700
23	0.08000	0.07200	40	0.04000	0.03600	57	0.03000	0.02700
24	0.08000	0.07200	41	0.03800	0.03420	58	0.03000	0.02700
25	0.08000	0.07200	42	0.03600	0.03240	59	0.03000	0.02700
26	0.07600	0.06840	43	0.03400	0.03060	60	0.03000	0.02700
27	0.07200	0.06480	44	0.03200	0.02880	61	0.03000	0.02700
28	0.06800	0.06120	45	0.03000	0.02700	62	0.03000	0.02700
29	0.06400	0.05760	46	0.03000	0.02700	63	0.03000	0.02700
30	0.06000	0.05400	47	0.03000	0.02700	64	0.03000	0.02700
31	0.05900	0.05310	48	0.03000	0.02700	65	0.03000	0.02700
32	0.05800	0.05220	49	0.03000	0.02700	66	0.03000	0.02700
33	0.05700	0.05130	50	0.03000	0.02700	67	0.03000	0.02700
34	0.05600	0.05040	51	0.03000	0.02700	68	0.03000	0.02700
35	0.05500	0.04950	52	0.03000	0.02700	69	0.03000	0.02700

## Appendix – Detailed Assumptions

### Withdrawal Rates Non-Teachers and State (4 to 5 years)

Age	Male	Female	Age	Male	Female	Age	Male	Female
19	0.04500	0.04500	36	0.02850	0.02850	53	0.01500	0.01500
20	0.04500	0.04500	37	0.02700	0.02700	54	0.01500	0.01500
21	0.04350	0.04350	38	0.02550	0.02550	55	0.01500	0.01500
22	0.04200	0.04200	39	0.02400	0.02400	56	0.01425	0.01425
23	0.04050	0.04050	40	0.02250	0.02250	57	0.01350	0.01350
24	0.03900	0.03900	41	0.02175	0.02175	58	0.01275	0.01275
25	0.03750	0.03750	42	0.02100	0.02100	59	0.01200	0.01200
26	0.03750	0.03750	43	0.02025	0.02025	60	0.01125	0.01125
27	0.03750	0.03750	44	0.01950	0.01950	61	0.01125	0.01125
28	0.03750	0.03750	45	0.01875	0.01875	62	0.01125	0.01125
29	0.03750	0.03750	46	0.01800	0.01800	63	0.01125	0.01125
30	0.03750	0.03750	47	0.01725	0.01725	64	0.01125	0.01125
31	0.03600	0.03600	48	0.01650	0.01650	65	0.01125	0.01125
32	0.03450	0.03450	49	0.01575	0.01575	66	0.01125	0.01125
33	0.03300	0.03300	50	0.01500	0.01500	67	0.01125	0.01125
34	0.03150	0.03150	51	0.01500	0.01500	68	0.01125	0.01125
35	0.03000	0.03000	52	0.01500	0.01500	69	0.01125	0.01125

### Withdrawal Rates Non-Teachers and State (greater than 5 years)

Age	Male	Female	Age	Male	Female	Age	Male	Female
19	0.04000	0.02800	36	0.02150	0.02170	53	0.01400	0.01366
20	0.04000	0.02800	37	0.02050	0.02065	54	0.01450	0.01383
21	0.03900	0.02765	38	0.01950	0.01960	55	0.01500	0.01400
22	0.03800	0.02730	39	0.01850	0.01855	56	0.01500	0.01400
23	0.03700	0.02695	40	0.01750	0.01750	57	0.01500	0.01400
24	0.03600	0.02660	41	0.01700	0.01680	58	0.01500	0.01400
25	0.03500	0.02625	42	0.01650	0.01610	59	0.01500	0.01400
26	0.03400	0.02590	43	0.01600	0.01540	60	0.01500	0.01400
27	0.03300	0.02555	44	0.01550	0.01470	61	0.01500	0.01400
28	0.03200	0.02520	45	0.01500	0.01400	62	0.01500	0.01400
29	0.03100	0.02485	46	0.01450	0.01383	63	0.01500	0.01400
30	0.03000	0.02450	47	0.01400	0.01366	64	0.01500	0.01400
31	0.02850	0.02415	48	0.01350	0.01350	65	0.01500	0.01400
32	0.02700	0.02380	49	0.01300	0.01333	66	0.01500	0.01400
33	0.02550	0.02345	50	0.01250	0.01316	67	0.01500	0.01400
34	0.02400	0.02310	51	0.01300	0.01333	68	0.01500	0.01400
35	0.02250	0.02275	52	0.01350	0.01350	69	0.01500	0.01400

# Appendix – Detailed Assumptions

## Disability Rates

Age	Male	Female	Age	Male	Female
19	0.00000	0.00000	40	0.00250	0.00200
20	0.00010	0.00008	41	0.00260	0.00208
21	0.00018	0.00014	42	0.00270	0.00216
22	0.00026	0.00021	43	0.00280	0.00224
23	0.00034	0.00027	44	0.00290	0.00232
24	0.00042	0.00034	45	0.00300	0.00240
25	0.00050	0.00040	46	0.00336	0.00267
26	0.00060	0.00048	47	0.00372	0.00294
27	0.00070	0.00056	48	0.00418	0.00322
28	0.00080	0.00064	49	0.00463	0.00349
29	0.00090	0.00072	50	0.00509	0.00376
30	0.00100	0.00080	51	0.00554	0.00413
31	0.00120	0.00096	52	0.00600	0.00450
32	0.00140	0.00112	53	0.00620	0.00486
33	0.00160	0.00128	54	0.00640	0.00523
34	0.00180	0.00144	55	0.00660	0.00560
35	0.00200	0.00160	56	0.00680	0.00624
36	0.00210	0.00168	57	0.00700	0.00688
37	0.00220	0.00176	58	0.00700	0.00752
38	0.00230	0.00184	59	0.00700	0.00816
39	0.00240	0.00192	60	0.00700	0.00880
			61+	0.00000	0.00000

# Appendix – Detailed Assumptions

## Retirement Rates

Age	Teachers		Non-Teachers & State	
	Male	Female	Male	Female
54	0.000	0.000	0.000	0.000
55	0.250	0.275	0.300	0.200
56	0.150	0.175	0.200	0.150
57	0.150	0.175	0.150	0.150
58	0.170	0.180	0.150	0.150
59	0.190	0.190	0.150	0.175
60	0.200	0.250	0.150	0.200
61	0.300	0.200	0.150	0.200
62	0.400	0.275	0.400	0.300
63	0.250	0.200	0.250	0.200
64	0.250	0.250	0.175	0.200
65	0.400	0.300	0.300	0.300
66	0.300	0.300	0.225	0.200
67	0.300	0.300	0.200	0.200
68	0.300	0.300	0.200	0.200
69	0.300	0.300	0.200	0.200
70+	1.000	1.000	1.000	1.000

# Appendix – Detailed Assumptions

## Salary Scales

Age	Teachers	Non-Teachers and State	Age	Teachers	Non-Teachers and State
19	5.250%	6.500%	45	4.050%	4.850%
20	5.250%	6.500%	46	4.010%	4.800%
21	5.200%	6.500%	47	3.970%	4.750%
22	5.150%	6.375%	48	3.930%	4.650%
23	5.100%	6.250%	49	3.890%	4.550%
24	5.050%	6.125%	50	3.850%	4.400%
25	5.000%	6.000%	51	3.850%	4.234%
26	4.950%	5.900%	52	3.850%	4.178%
27	4.900%	5.800%	53	3.850%	4.122%
28	4.850%	5.700%	54	3.850%	4.066%
29	4.800%	5.600%	55	3.850%	4.010%
30	4.750%	5.500%	56	3.850%	3.954%
31	4.700%	5.475%	57	3.850%	3.898%
32	4.650%	5.450%	58	3.850%	3.842%
33	4.600%	5.425%	59	3.850%	3.785%
34	4.550%	5.400%	60	3.850%	3.730%
35	4.500%	5.375%	61	3.850%	3.674%
36	4.450%	5.350%	62	3.850%	3.618%
37	4.400%	5.325%	63	3.850%	3.562%
38	4.350%	5.300%	64	3.850%	3.506%
39	4.300%	5.275%	65	3.850%	3.400%
40	4.250%	5.250%	66	3.830%	3.400%
41	4.210%	5.200%	67	3.810%	3.400%
42	4.170%	5.100%	68	3.790%	3.400%
43	4.130%	5.000%	69	3.770%	3.400%
44	4.090%	4.900%	70	3.750%	3.400%