

**2010 Actuarial Interest Rate Review  
Summary and Recommendation to the  
West Virginia Consolidated Public Retirement Board  
September 22, 2010**

**Annual Actuarial Interest Rate Review**

Upon direction of the Board, the actuarial valuation interest rate assumption is reviewed annually. This includes an experience review of the interest return for the PERS trust fund, the expected returns based upon projections by investment professionals and national public plans' practices. This review is independent of and in addition to any experience study completed for the year.

**Overview**

This report summarizes the interest rate review results and the assumption being recommended by the Board Actuary effective with the July 1, 2010 actuarial valuation applicable to each of the eight defined benefit plans administered by the Board. The review was completed by the Board Actuary and reviewed by David L. Driscoll, FSA, EA, MAAA, of Buck Consultants. Investment experience for FY2010 was reported by the West Virginia Investment Management Board (WVIMB) for each plan. Future return projections were completed by WVIMB and Buck Consultants (based on June 30, 2010 assets held). National practice averages were summarized from the Wisconsin Report – December 2009.

**Details of the Annual Interest Rate Review and Recommendation**

All defined benefit plans' trust fund assets are invested similarly by the WVIMB and therefore a single interest rate is applied to all eight plans administered by the Board. Some differences in the actual returns is a result of the timing of deposits and the level of benefit payments impacting the cash flow for each plan. Primary historical analysis focuses upon the results for PERS as the flagship plan for West Virginia public employees.

1. Exhibit: Interest Rate Analysis and Recommended Assumption.
  - a. PERS FY2010 experience after administrative expenses of 15.92%.
  - b. PERS 15 Year historical return average after expenses of 5.66%.
  - c. WVIMB expected 10 year return analysis at the 50<sup>th</sup> percentile rate of 8.40%, adjusted to 8.29% after expenses.
  - d. Buck Consultants expected return projections based on WVIMB June 30, 2010 investment report at the 50<sup>th</sup> percentile level.
    - i. Ten year projection of 7.46%; after expenses of 7.35%.
    - ii. Long term projection of 8.06%; after expenses of 7.95%.
  - e. Public Fund Survey average rate of 7.93%.
  - f. Weighted Return Rate Analysis 6/30/2010 of 7.50%.
  - g. Recommended Interest Rate Assumption of 7.50%, unchanged from 2009.

2. Additional Exhibits Providing Details of the Review.
  - a. Summary of Historical Return Rates by Plan – June 30, 2010.
  - b. Key Items Summary from: Wisconsin Report – December 2009.
  - c. West Virginia Investment Management Board – CPRB Asset Return Update August 10, 2010 prepared by Strategic Investment Solutions, Inc.
  - d. Buck Consultants letter of August 18, 2010; West Virginia Pension Funds Investment Return Calculation Results.

**Requested Board Action**

The Board Actuary respectfully requests the Board to approve the continuation of the 7.5% long term interest rate and discount assumptions for the all plans.

Prepared by: Harry W. Mandel, MAAA, MSPA, EA  
Board Actuary

# Interest Rate Analysis and Recommended Assumption

## July 1, 2010 Actuarial Valuations

### A. Current Year Investment Return Average for PERS

1. FY2010 Return for PERS - IMB	16.03%	
2. Administrative Expenses FY2009	-0.11%	
3. Actual Actuarial Return Net of Expenses		15.92%

### B. 15 Year Historical Investment Return Average for PERS

1. FY2010 Average 15 Year Return for PERS	5.77%	
2. Administrative Expenses FY2009	-0.11%	
3. Actual Actuarial Return Net of Expenses		5.66%

### C. Expected Future 10 Year Investment Return Projections from IMB

1. Expected Average Return 50th Percentile	8.40%	
2. Administrative Expenses FY2009	-0.11%	
3. IMB Expected Return Current Code Provisions		8.29%

### D. Expected Future Investment Return from Buck Consultants Projection

1. Expected 10 Year Return 50th Percentile	7.46%	
2. Administrative Expenses FY2009	-0.11%	
3. Actuarial Return Net of Expenses 10 Year		7.35%
4. Expected Long Term Return 50th Percentile	8.06%	
5. Administrative Expenses FY2009	-0.11%	
6. Actuarial Return Net of Expenses Long Term		7.95%

### E. Development of Recommended Actuarial Return Net of Expenses

	Expected Rate	Percent Weighting
1. Historical 15 Year Average	5.66%	15.00%
2. Expected 10 Year Average IMB Projection	8.29%	25.00%
3. Expected 10 Year Average Buck Projection	7.35%	12.50%
4. Expected Long Term Average Buck Projection	7.95%	12.50%
5. Wisconsin Report (December 2009))	7.93%	10.00%
6. Current Assumption Stability Rate	7.50%	25.00%
7. Weighted Return Rate Analysis 6/30/2010	7.50%	100.00%
8. Weighted Return Rate Analysis 6/30/2009	7.25%	
9. Weighted Return Rate Analysis 6/30/2008	7.67%	
10. Weighted Return Rate Analysis 6/30/2007	7.69%	
11. Weighted Return Rate Analysis 6/30/2006	7.62%	
12. Recommended Interest Rate Assumption 2010	7.50%	

# Summary of Historical Return Rates by Plan - June 30, 2010

Play Year Ending	PERS	TRS	Trooper		JRS	DSRS	EMSRs	MPFRS
			Plan A	Plan B				
06/30/1991	9.44%	10.65%	12.51%		11.19%	9.44%	**	
06/30/1992	14.67%	15.10%	14.75%		15.98%	14.67%	**	
06/30/1993	15.96%	11.15%	11.88%		11.76%	15.96%	**	
06/30/1994	-1.41%	-2.63%	-1.30%		-1.57%	-1.41%	**	
06/30/1995	11.65%	11.59%	11.17%	10.43%	10.95%	11.65%	**	
06/30/1996	4.10%	4.08%	4.15%	4.46%	4.07%	4.10%	**	
06/30/1997	8.11%	8.08%	8.07%	8.11%	8.07%	8.11%	**	
06/30/1998	10.74%	10.66%	10.71%	10.60%	10.71%	10.74%	**	
06/30/1999	7.06%	6.73%	6.82%	6.10%	6.54%	7.06%	**	
06/30/2000	8.15%	8.11%	8.02%	7.36%	8.02%	7.75%		
06/30/2001	-0.33%	-0.25%	-0.24%	0.47%	-0.09%	0.22%		
06/30/2002	-2.87%	-2.94%	-2.79%	-2.93%	-2.92%	-2.87%		
06/30/2003	4.88%	4.75%	5.71%	4.76%	4.90%	4.88%		
06/30/2004	15.17%	15.08%	15.68%	15.00%	15.20%	15.29%		
06/30/2005	10.72%	10.56%	10.60%	10.65%	10.69%	10.65%		
06/30/2006	9.45%	9.55%	9.21%	9.23%	9.35%	9.37%		
06/30/2007	17.57%	17.43%	17.62%	17.40%	17.45%	17.50%		
06/30/2008	-6.54%	-7.64%	-6.81%	-6.58%	-6.77%	-6.76%		-3.48%
06/30/2009	-15.64%	-16.06%	-15.63%	-15.18%	-15.51%	-15.37%		-15.12%
06/30/2010	16.03%	15.20%	16.06%	15.87%	16.00%	15.98%		0.02%
Average 3 Yr	-2.05%	-2.83%	-2.13%	-1.96%	-2.09%	-2.05%		-0.97%
Average 5 Yr	4.17%	3.70%	4.09%	4.15%	4.10%	4.14%		
Average 7 Yr	6.68%	6.30%	6.68%	6.63%	6.63%	6.67%		
Average 10 Yr	4.84%	4.57%	4.94%	4.87%	4.83%	4.89%		
Average 15 Yr	5.77%	5.56%	5.81%	5.69%	5.71%	5.78%		
Average 20 Yr	6.85%	6.46%	6.81%	5.98% ***	6.70%	6.85%		

\* Annual Rate as reported by the IMB

\*\* For statistical purposes, investments were included with the PERS Plan through 6/30/1999 from which assets were transferred.

\*\*\* This average is over the 16 year existence of Plan B.

Note: Results for 1991 through 2001 prepared by D.H. Rosier.

# Key Items Summary from: Wisconsin Report - December 2009

## A. Plans included in the Wisconsin Report.

1. 85 statewide public employees and teacher plans.
2. Survey includes 2008 actuarial information.
3. Includes 15 Social Security Replacement Plans.
4. Includes West Virginia PERS and TRS in Survey.

## B. Survey averages compared to West Virginia assumptions.

1. Net interest discount and return rate.		
Survey average		7.93%
West Virginia		7.50%
2. Underlying assumed rate of inflation.		
Survey average		3.59%
West Virginia		3.00%
3. Net true Growth rate in excess of inflation.		
Survey average		4.34%
West Virginia		4.50%

## C. Observations regarding the interest rate assumptions.

1. 21.2% of plans use WV rate of 7.5% or less.
2. 14.1% use the West Virginia rate of 7.5%.
3. Lowest reported rate was 7.00%.
4. Highest reported rate was 8.5%.
5. CALPERS 7.75% and CALSTRS 8.00%.

## D. Observations regarding plans in Wisconsin Report.

1. Entry Age Method applied by 82.4% of all plans (incl WV).
2. Average Funded Percentage for 2008 valuations was 83.0%.
3. 82.4% of plans covered by Soc Sec; 17.6% are not..
4. Soc Sec covered plans avg member contr rate is 4.8%.
5. Non covered plans have a member contr rate of 8.9%.
6. Soc Sec covered plans have an average formula of 1.8% of FAP 3.4 yrs.
7. Non covered plans average formula of 2.4% of FAP 3.1 yrs.

## E. Summary of State Tax on Retirement Benefits.

1. 65% tax benefits and 35% do not have any tax on plan benefits.
2. 50.1% exempt \$5,000 or less from state tax.
3. 36% exempt \$10,000 to \$41,000 from state tax.

## F. Cost of Living Provisions

1. 24.7% have no automatic COLA; rely on ad hoc increases only.
2. 8.2% have a performance based COLA, such as excess interest returns.
3. 67.1% of plans have automatic COLA averaging 3.1% annually.

Summary prepared by Harry W. Mandel, Board Actuary

WEST VIRGINIA INVESTMENT MANAGEMENT BOARD

**CONSOLIDATED PUBLIC RETIREMENT BOARD  
ASSET RETURN UPDATE**

August 10, 2010

STRATEGIC INVESTMENT SOLUTIONS, INC.

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333 Bush Street, Suite 2000  
San Francisco, CA 94104  
(415) 362-3484



# Asset Class Assumptions

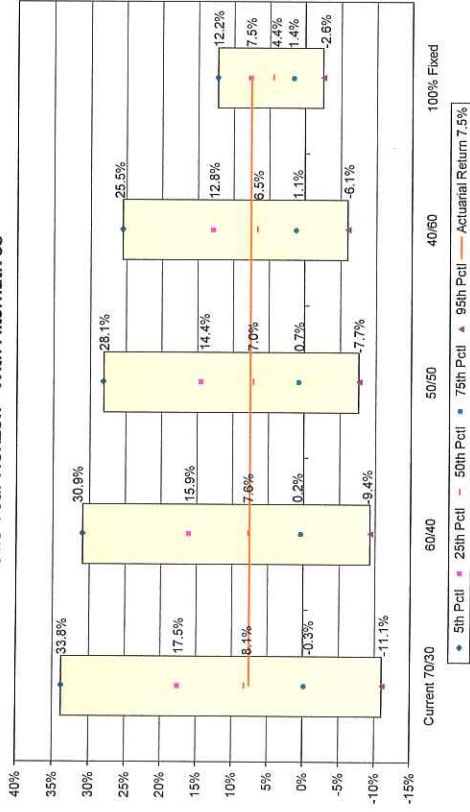
	EXPECTED BENCHMARK RETURN	EXPECTED BENCHMARK VOLATILITY	MANAGER ALPHA	MANAGER TRACKING ERROR	TOTAL RETURN	TOTAL VOLATILITY
CORE FIXED INCOME	3.9%	4.5%	0.5%	1.7%	4.4%	4.8%
CORE PLUS FIXED INCOME	4.2%	4.5%	0.9%	3.0%	5.1%	5.4%
HEDGE FUNDS	7.0%	10.0%	0.0%	0.0%	7.0%	10.0%
PRIVATE CORE REAL ESTATE	7.0%	18.0%	0.0%	0.0%	7.0%	18.0%
PRIVATE VALUE ADDED REAL ESTATE	9.0%	27.0%	0.0%	0.0%	9.0%	27.0%
LARGE CAP CORE	8.3%	17.0%	1.2%	4.0%	9.5%	17.5%
LARGE CAP VALUE	8.3%	18.2%	1.5%	5.0%	9.8%	18.9%
LARGE CAP GROWTH	8.3%	19.6%	1.5%	5.0%	9.8%	20.2%
NON LARGE CAP CORE	8.7%	19.5%	1.8%	6.0%	10.5%	20.4%
NON LARGE CAP VALUE	8.7%	19.0%	2.4%	8.0%	11.1%	20.6%
NON LARGE CAP GROWTH	8.7%	23.2%	2.1%	7.0%	10.8%	24.2%
INTL DEVELOPED LARGE CORE	8.3%	17.8%	1.2%	4.0%	9.5%	18.2%
INTL DEVELOPED LARGE VALUE	8.3%	17.0%	1.7%	5.5%	10.0%	17.9%
INTL DEVELOPED LARGE GROWTH	8.3%	19.0%	1.5%	5.0%	9.8%	19.6%
INTL DEVELOPED SMALL CAP	8.3%	20.5%	2.0%	6.5%	10.3%	21.5%
EMERGING MARKETS	8.9%	30.0%	1.5%	5.0%	10.4%	30.4%
PRIVATE EQUITY	10.8%	35.0%	0.0%	0.0%	10.8%	35.0%



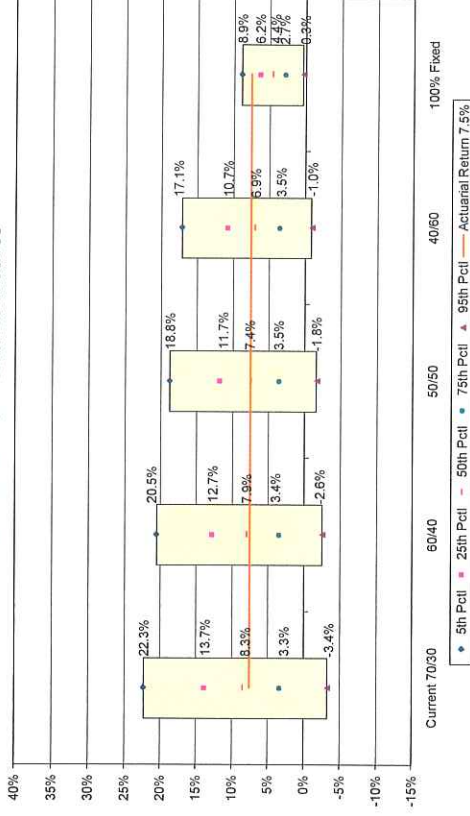
# Expected Return Distributions

(no manager alpha)

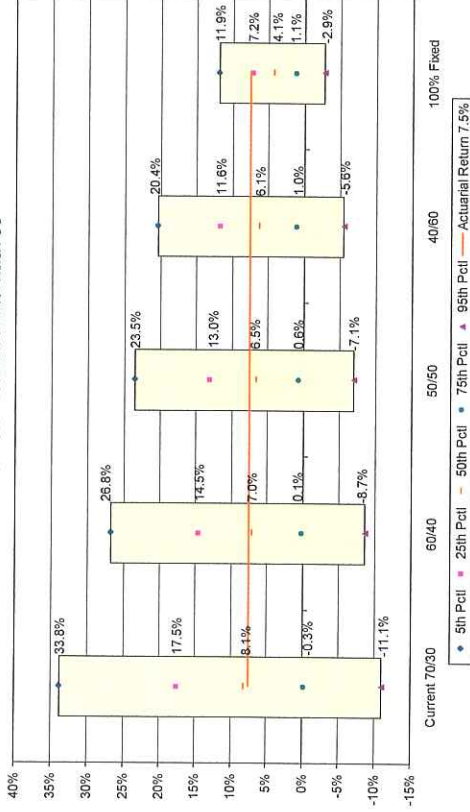
One Year Horizon - With Alternatives



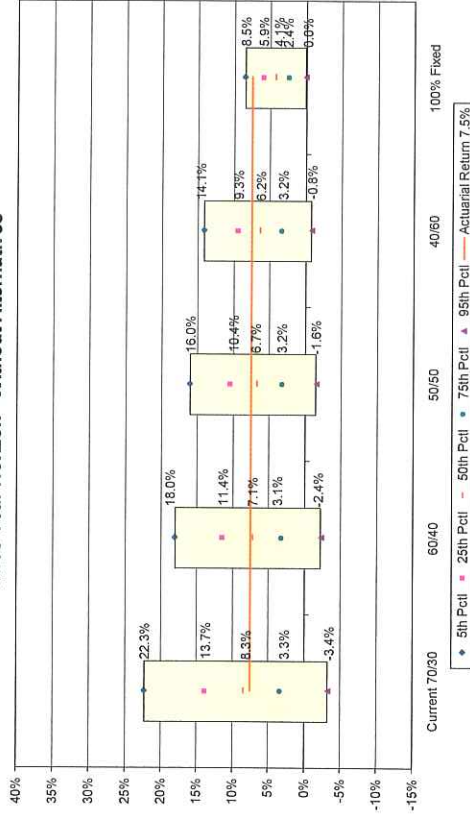
Three Year Horizon - With Alternatives



One Year Horizon - Without Alternatives



Three Year Horizon - Without Alternatives



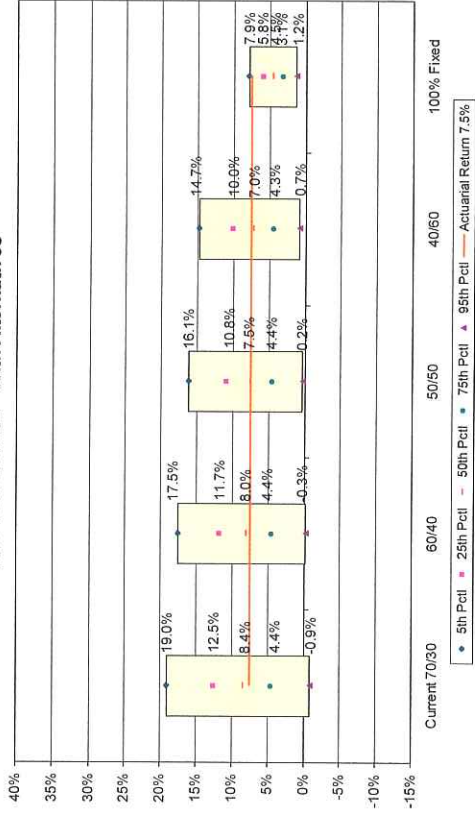




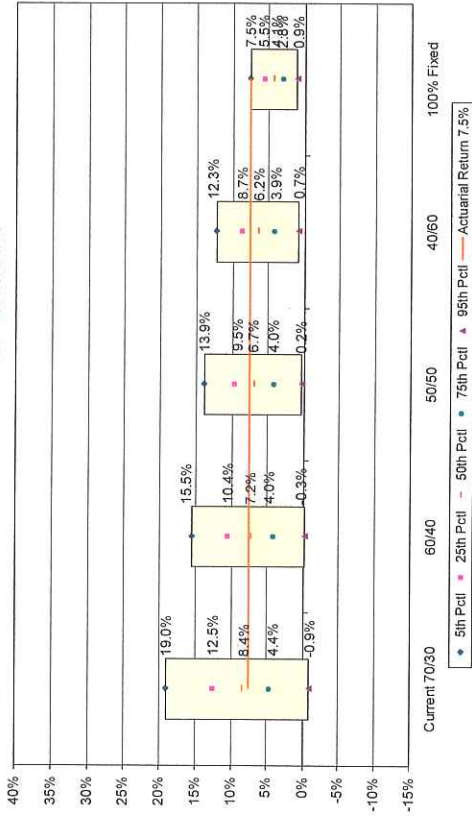
# Expected Return Distributions

(no manager alpha)

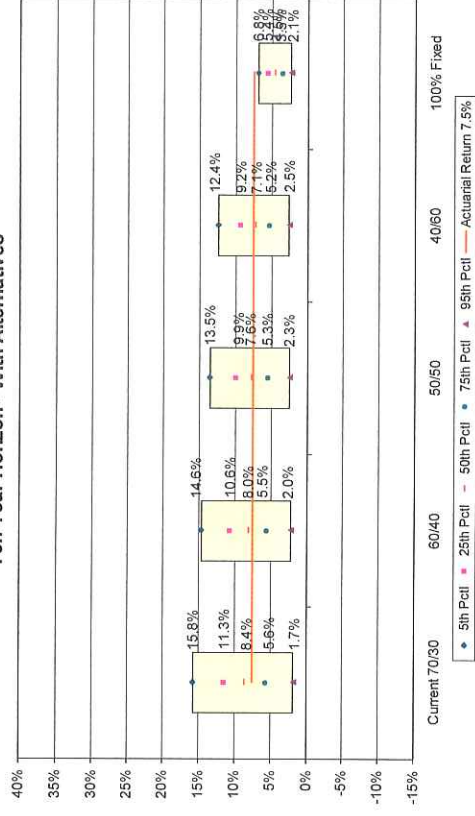
Five Year Horizon - With Alternatives



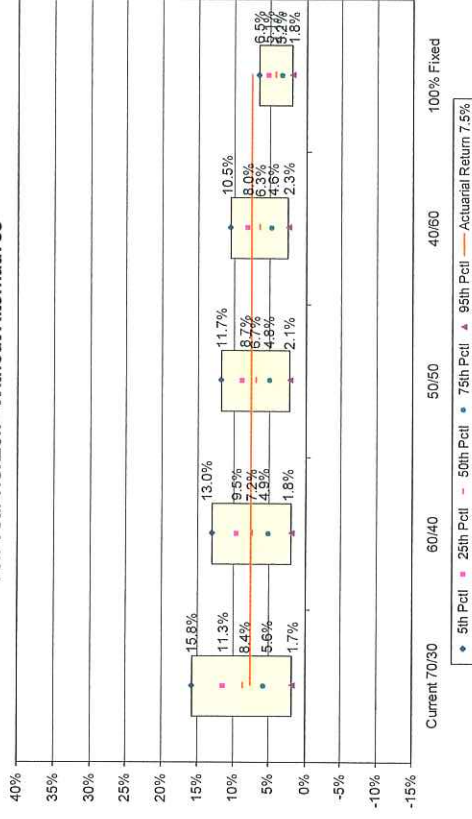
Five Year Horizon - Without Alternatives



Ten Year Horizon - With Alternatives



Ten Year Horizon - Without Alternatives





## Asset Mixes

	WITH ALTERNATIVES				
	CURRENT 70/30	60/40	50/50	40/60	100% FIXED
PUBLIC EQUITY	50	40	30	20	0
PRIVATE EQUITY	10	10	10	10	0
REAL ESTATE	10	10	10	10	0
FIXED INCOME	20	30	40	50	90
HEDGE FUNDS	10	10	10	10	10

	WITHOUT ALTERNATIVES				
	CURRENT 70/30	60/40	50/50	40/60	100% FIXED
PUBLIC EQUITY	50	60	50	40	0
PRIVATE EQUITY	10	0	0	0	0
REAL ESTATE	10	0	0	0	0
FIXED INCOME	20	40	50	60	100
HEDGE FUNDS	10	0	0	0	0

August 18, 2010

Mr. Harry Mandel  
Board Actuary  
West Virginia Consolidated Public Retirement Board  
4101 MacCorkle Ave., SE  
Charleston, WV 25304

Dear Mr. Mandel:

We are attaching an Exhibit outlining a range of compound average rates of return for the Pension Funds under the current asset investment policy. These results update the 2009 results provided in our letter of September 3, 2009.

Compound average returns are presented for the portfolio over one-year, ten-year, and 20-year holding periods and were generated by an economic and capital markets multifactor model that creates internally consistent, realistic economic scenarios (inflation, GDP, interest rates) and related asset class return scenarios that reflect the current economic environment as a starting point. The model reflects two important capital market attributes that other models such as a mean variance model ignore. First, asset class correlations may vary from year to year (just as in the real world), as well as from path to path. Second, asset class return distributions are not constrained to be normally distributed, and will have fatter "tails" that more accurately incorporate the possibility of rare events (such as the market turmoil of 2008–2009).

The primary result is that the expected annualized return over ten years for the current allocation is 7.18% (simple average) and 6.86% (geometric average using compounding).

All return results included are gross of inflation. Since our model is an economic scenario generator, inflation is an output from the model that varies over time. As a result, the forecast average inflation will vary depending on the forecast length. As you review the attached Exhibit, you will see that the model forecasts low inflation for the current year and higher rates over longer periods of time.

Changes from last year's figures arise from changes in the current asset allocation and from the change in our underlying model.

If you have any questions concerning these forecasts or the model used to estimate these values, please call me at (212) 330-1297.

Sincerely,

Stuart M. Schulman, FSA, FCA, MAAA



Director, Consulting Actuary

SMS:AF  
Enc.

cc: Mr. Michael C. Wright  
Mr. David Driscoll  
Mr. Jason Shapiro

## West Virginia Pension Funds Investment Return Calculation Results

<u>Asset Class</u>	<u>Current Asset Allocation</u>			
Stocks (Large-Cap, Domestic)	16.08%			
Stocks (Mid-Cap, Domestic)	1.34%			
Stocks (Small-Cap, Domestic)	2.01%			
Stocks (International)	15.78%			
Stocks (Emerging Equity)	5.41%			
Fixed Income	31.48%			
Annuities	1.43%			
Cash Equivalents	2.72%			
TIPS	4.22%			
Private Equity	8.56%			
Direct Real Estate	0.35%			
REITs	0.08%			
Hedge Funds	10.54%			
		1-Year	10-Year	20-Year
Expected Nominal Return (Arithmetic)		4.88%	7.18%	7.98%
Expected Nominal Return (Compound)		4.88%	6.86%	7.64%
Standard Deviation (Arithmetic)		7.55%	3.04%	2.31%
Percentile	95%	15.96%	11.64%	11.71%
	75%	10.29%	9.38%	9.54%
	50%	5.56%	7.46%	8.06%
	25%	-0.17%	5.15%	6.51%
	5%	-8.50%	2.04%	4.12%
Expected Inflation (Arithmetic)		1.90%	3.49%	3.70%
Expected Inflation (Compound)		1.90%	3.47%	3.68%
Percentile	95%	4.57%	5.66%	6.07%
	75%	2.90%	4.34%	4.55%
	50%	1.86%	3.46%	3.62%
	25%	0.81%	2.55%	2.76%
	5%	-0.53%	1.35%	1.59%
Expected Real Return (Arithmetic)		2.98%	3.70%	4.29%
Expected Real Return (Compound)		2.98%	3.39%	3.96%
Standard Deviation (Arithmetic)		7.76%	2.98%	2.12%
Percentile*	95%	14.34%	8.03%	7.59%
	75%	8.55%	5.76%	5.72%
	50%	3.66%	3.94%	4.45%
	25%	-2.14%	1.95%	2.96%
	5%	-10.27%	-1.63%	0.62%

\* Note that the path containing (for example) the 75th percentile of nominal return may not be the same path producing the 75th percentile of inflation or the 75th percentile of real return.