

***Summit Strategies Group***

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*St. Louis, Missouri 63105*

*314/727-7211*

**Asset/Liability Study**

**(Revised)**

**Tulare County Employees'  
Retirement Association**

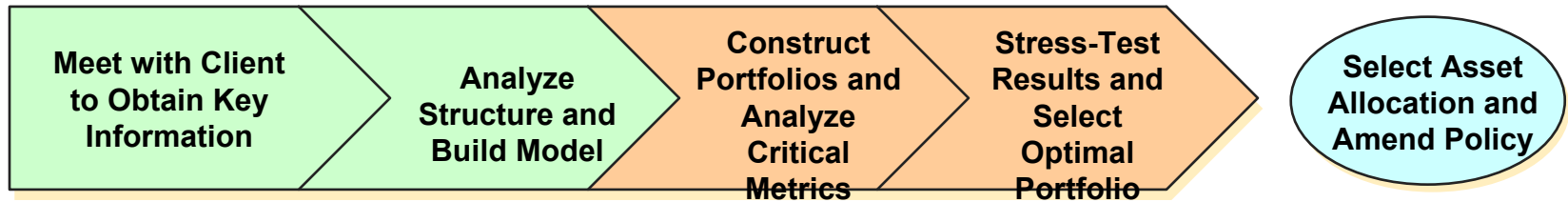
May 27, 2009

## SUMMIT'S ASSET/LIABILITY PROCESS

### Philosophy

- Investment strategies should be fully-integrated with the liability and fund objectives
- Risk should be continually assessed and managed

### Approach



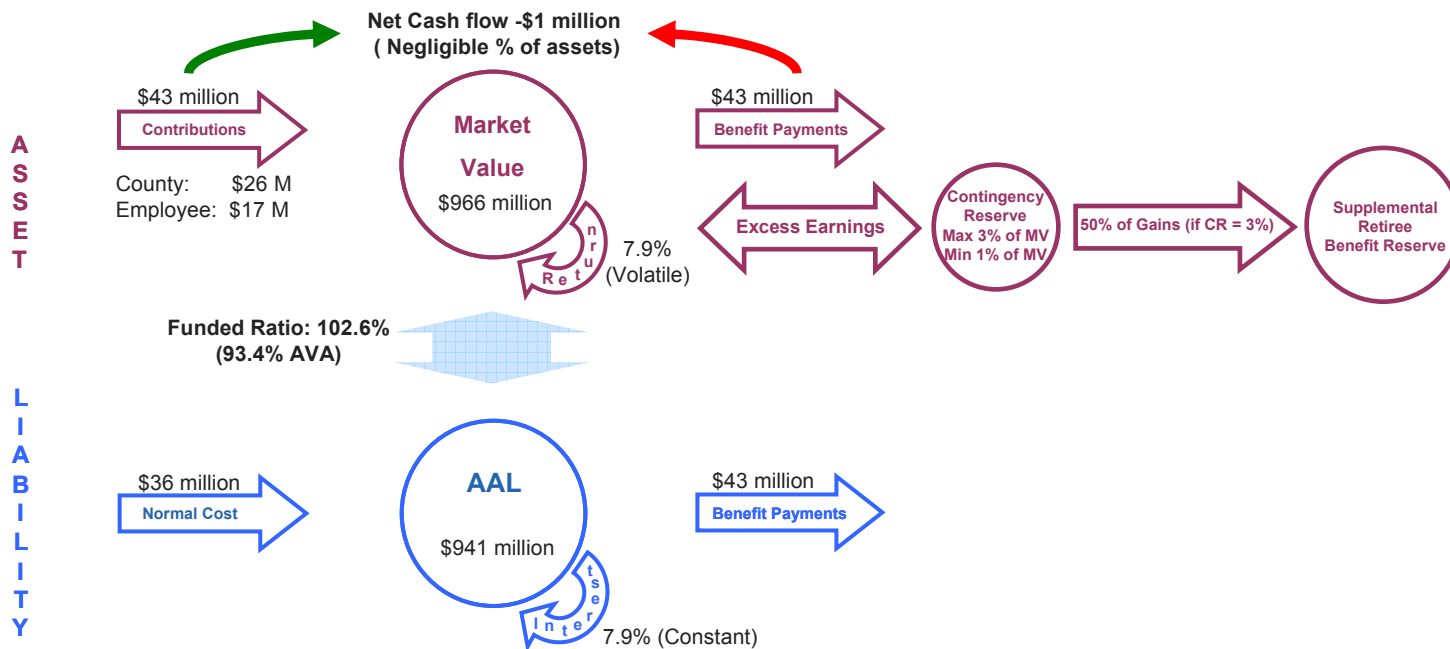
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| <ul style="list-style-type: none"> <li>• Review plan document               <ul style="list-style-type: none"> <li>- Plan provisions</li> </ul> </li> <li>• Review actuarial valuation               <ul style="list-style-type: none"> <li>- Gather participant census data</li> <li>- Review valuation assumptions</li> <li>- Review liability measures for actives, retirees, terminates</li> </ul> </li> <li>• Review investment policy               <ul style="list-style-type: none"> <li>- Key fund objectives</li> <li>- Funding considerations</li> <li>- Expense sensitivity</li> <li>- Liquidity needs</li> <li>- Future workforce needs</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• Load individual data</li> <li>• Build all benefit provisions</li> <li>• Build all actuarial, economic and decremental assumptions</li> <li>• Produce baseline projection</li> <li>• Construct cash flow projections (benefit payments and contributions)</li> <li>• Calculate duration (interest rate sensitivity) of the liability</li> <li>• Determine target rates of return that meet various objectives</li> </ul> | <ul style="list-style-type: none"> <li>• Screen assets for liquidity and appropriateness</li> <li>• Design alternative portfolios within the context of the liability structure and the company's objectives with varying degrees of risk</li> <li>• Examine each portfolio within the framework of expected/worst/best case results for the critical metrics identified earlier               <ul style="list-style-type: none"> <li>- Typically, this includes market value, funded status, contributions, and pension expense</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• Select portfolios for further stress testing               <ul style="list-style-type: none"> <li>- Simultaneously model poor asset and liability experience</li> </ul> </li> <li>• Evaluate portfolio impact on funding adequacy, cash flow requirements, and expense trends</li> <li>• Simulate extreme historical periods for feasible portfolios</li> </ul> | <ul style="list-style-type: none"> <li>• Select asset allocation               <ul style="list-style-type: none"> <li>- Policy ranges (minimum, target, maximum)</li> <li>- Equity style allocations</li> <li>- Fixed income sector allocations</li> <li>- Fixed income duration target</li> </ul> </li> <li>• Institute rebalancing program</li> <li>• Develop customized performance benchmarks</li> </ul> |
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- Identify critical metrics

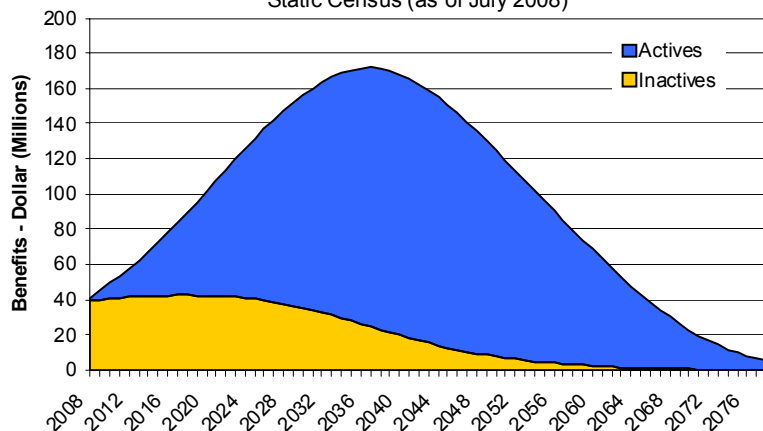
## **ASSET / LIABILITY ANALYSIS: BASELINE PROJECTION**

- This analysis details the characteristics and projection of the Tulare County Employees' Retirement Association's assets and liabilities.
- The first part of the analysis includes a baseline projection of the plan's population, asset and liability values, funded status, benefit payments and liquidity needs.
- This baseline projection provides a foundation for the remainder of the study which will entail an extensive analysis of the viability of various asset allocations in simulated volatile market environments.
  - Certain metrics for each portfolio are compared against the baseline projection. Those metrics include asset return, asset market value, funded status and contribution requirements.
- The study is based upon the plan's participant data and the actuarial valuation as supplied by Buck Consultants. The valuation was prepared as of 6/30/08, however the analysis incorporates the assumption changes as of 12/08.

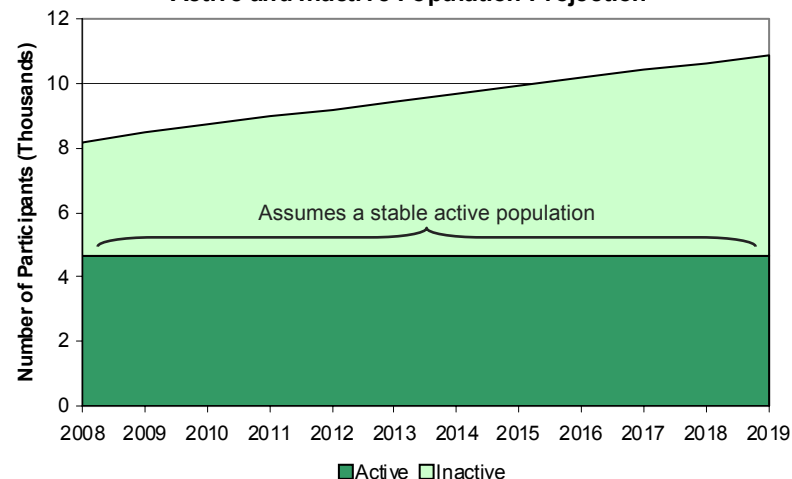
INITIAL ASSET / LIABILITY PICTURE (AS OF 7/1/08)



Composite Long-Term Benefit Projection  
Static Census (as of July 2008)



Active and Inactive Population Projection



## **ASSET / LIABILITY STUDY ASSUMPTIONS**

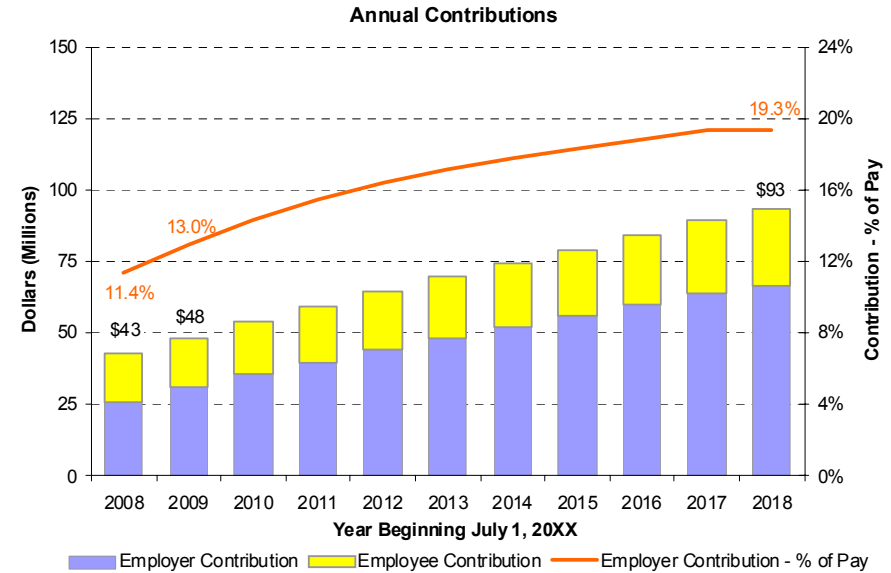
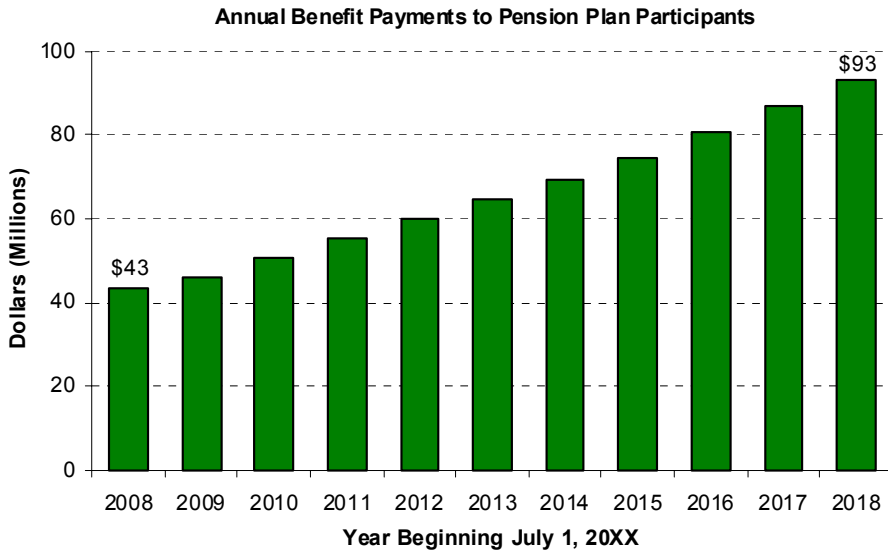
➤ Pension Model:

- Participant data for the Tulare County Employees' plan are as of 6/30/08.
- The actuarial assumptions from Buck Consultants' June 30, 2008 actuarial report were used, including the assumption changes as of December 2008.
- A 10-year asset smoothing period without a market value corridor was incorporated for the entire projection.
- Used benefit formula and provision specific to each participant in each group.

➤ Baseline Projection:

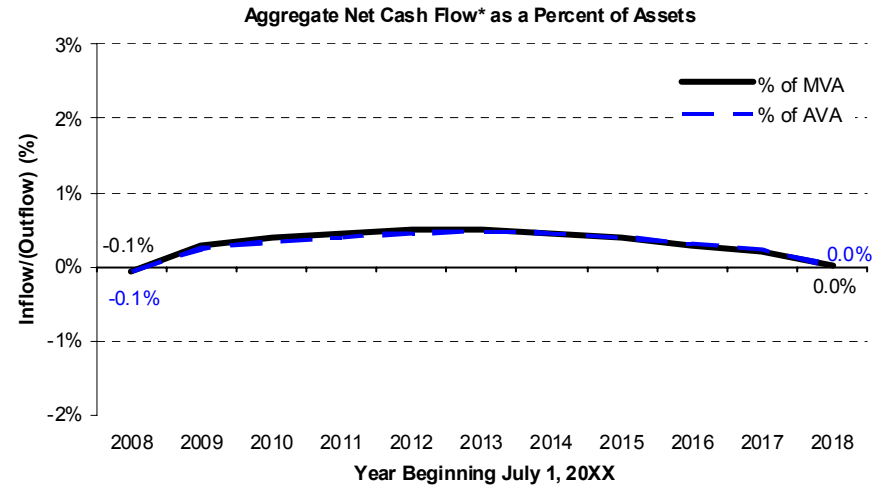
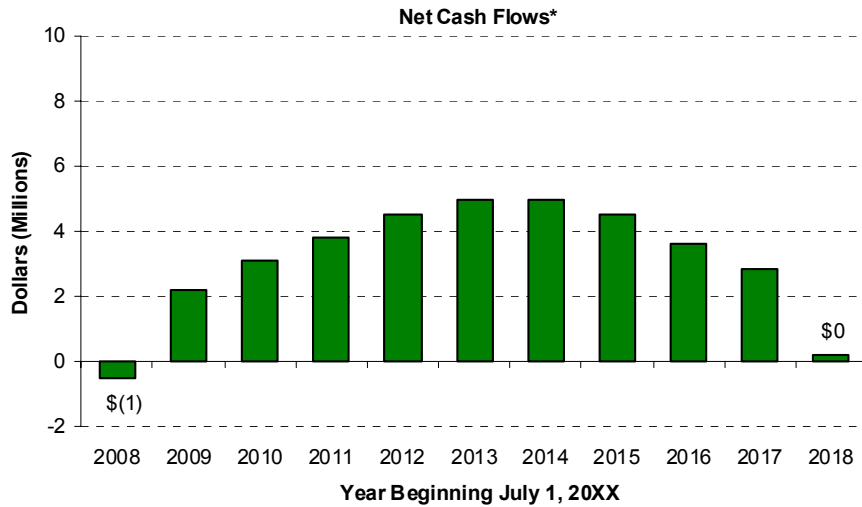
- Eleven year projection period (the period 7/1/2008 through 6/30/2009 + 10-year projection).
- The discount rate, CPI and wage inflation are held constant throughout the baseline projection.
- With exception of the first year, the expected return on the plan's assets is held constant at 7.9%. A negative 23.3% asset return was used for the first year, which is the best estimate of the actual return of the plan's assets through the end of April 2009 and it is assumed that this return does not change for the remainder of the fiscal year.
- The assets and liabilities that are presented throughout this study correspond to the regular plan and do not include supplemental asset/liabilities. However, the projection *does* capture the effect of the supplemental reserves on the regular plan:
  - On a semi-annual basis, fifty percent of excess earnings (gains) are allocated to the Supplemental Retiree Benefit Reserve (SRBR) in order to fund supplemental benefits.
  - Assets within the Contingency Reserve are allowed to flow back to the regular plan, provided that the Contingency Reserve does not fall below 1% of market value.

**BASELINE PROJECTION: BENEFIT PAYMENTS AND CONTRIBUTIONS**



- In 2008, benefit payments were projected to be about \$43 million and are expected to grow approximately 8.0% annually over the next ten years. The inactive/active split evolves from about 52%/48% to 62%/38%.
- The employer contribution rate for the pension plan in 2008 was 11.4% of payroll, or \$26 million. This rate increases to 13.0% of payroll in 2009 (\$31 million), continues to increase throughout the remainder of the projection and ends at 19.3% of payroll.

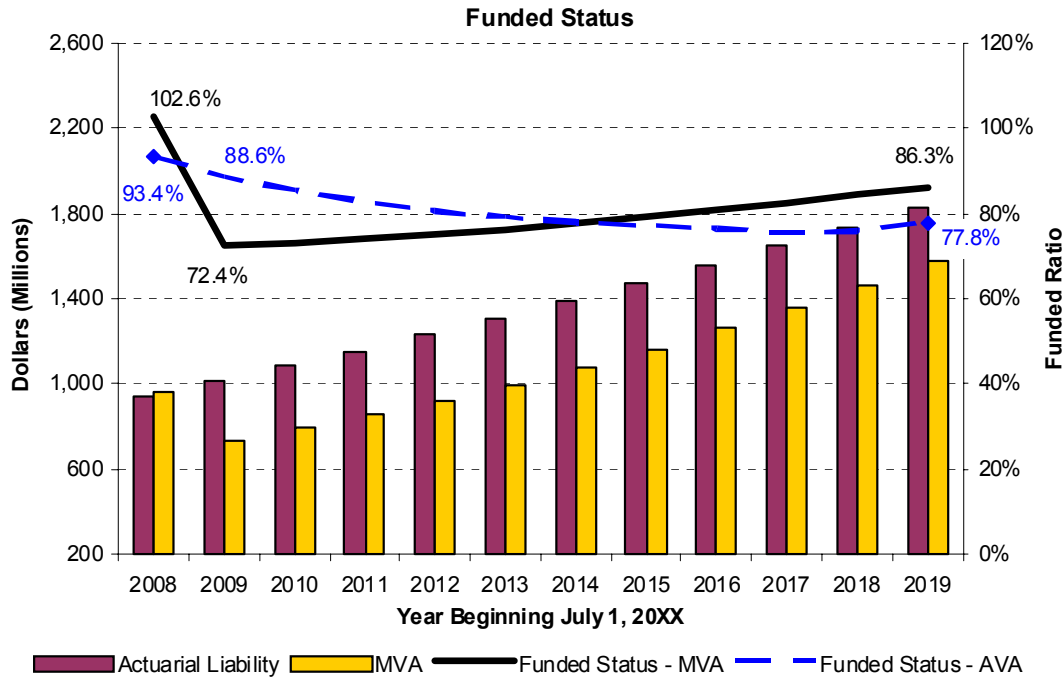
BASELINE PROJECTION: LIQUIDITY



- After 2008, the net cash flow for the pension plan is positive for the remainder of the projection. That is, the cash flows out of the plan (benefit payments) are less than the total contributions (employer and participants).
- The annual net cash outflow as a percent of assets (on a MVA basis, as well as an AVA basis) is projected to be slightly positive for most of the projection. Hence, liquidity is not a concern in the near or long-term and can be easily managed through routine rebalancing of the portfolio.

\*Net Cash Flow refers to the difference between the contributions into the pension plan (County and employee) less participant payments (pension benefits). It does not include investment or other ancillary fees.

**BASELINE PROJECTION: ACCRUED LIABILITY AND FUNDED STATUS**

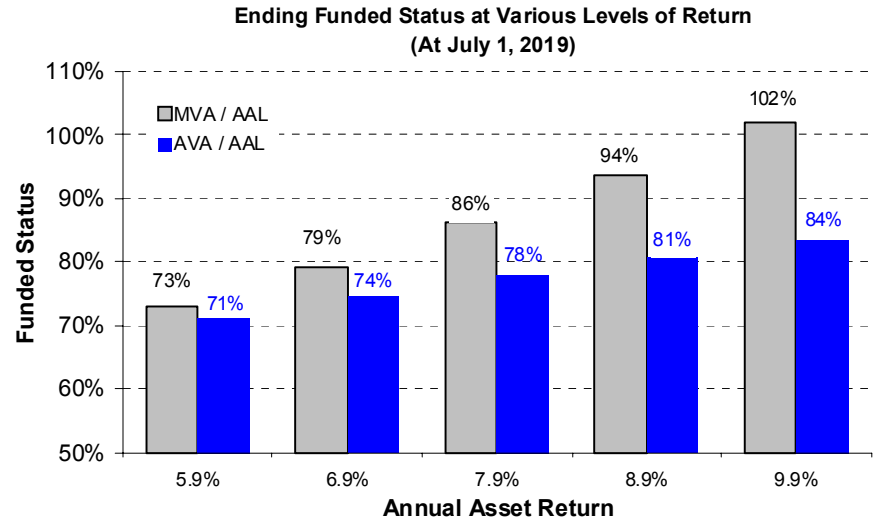


- The AAL grows from \$941 million to \$1,831 million, while the market value of assets (MVA) initially falls from \$966 million to \$732 million (2009), then slowly increases to \$1,579 million in 2019.
- The funded status (AVA/AAL), represented by the dashed line in the chart, started at 93.4% on 7/1/08 and is projected to decline to an estimated 75.9% in 2018, then increase to 77.8% in 2019.
- The funded status (MVA/AAL) starts the projection at 102.6%, falls 30.3% in 2009 to 72.4%, then slowly improves to end the projection at 86.3%. Note that the MVA includes the SRBR and Contingency Reserves, hence the higher funded status.
- The significant decline in funding status is due to the underperformance of the plan's assets (-23.3%) assumed for the 2008 – 2009 fiscal year. The plan's target return is 7.9%.
- Because of the smoothing method, the funded status on an actuarial asset basis does not reflect the entire impact of the 2008 loss until 2018 (10-year smoothing).

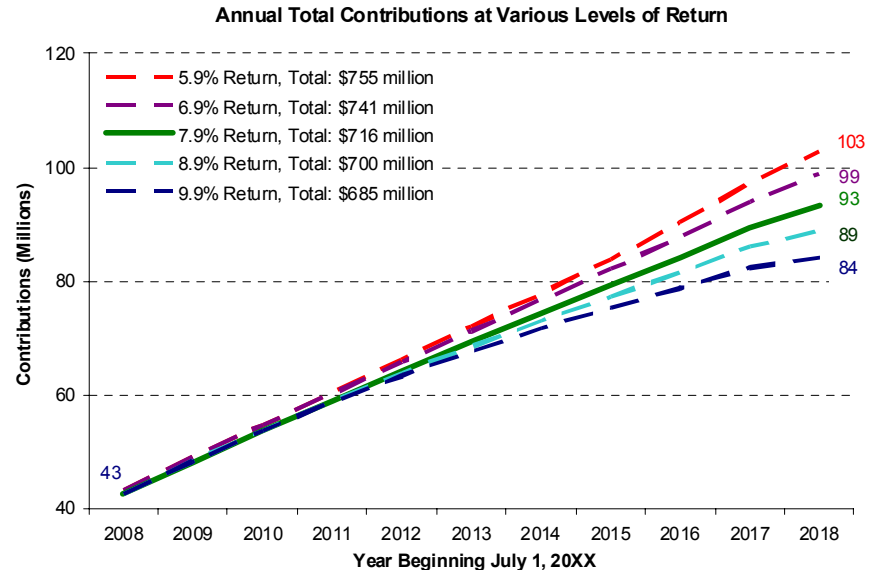


**BASELINE PROJECTION: IMPACT OF DIFFERENT ASSET RETURNS**

- The target return for the plan is 7.9%. If this return is achieved annually the funded status will decline to 86.3% and 77.8% at the end of the projection period (on a MVA and AVA basis, respectively).
- As the chart to the right illustrates, the effect of realizing a return other than 7.9% can have a significant impact on the funded status over time. If the plan achieved a 9.9% return every year throughout the projection period the plan will reach a 101.9% funded status (on a market value of asset basis).



- An asset return that exceeds the expected return, even marginally, can have a dramatic impact on the pension plan's required contributions. As the second chart demonstrates, every 1.0% of return over 7.9% results in a savings of over \$15 million over the projection period. Unfortunately, if the plan's returns are lower than 7.9% expected return, the impact on contributions can be as much as \$25 million per percent shortfall.



## **BASELINE PROJECTION: CONCLUSIONS**

- On a market value basis (MVA), the funded status of the plan is projected to fall significantly in 2008-2009 due to the credit crisis, the economic slow-down and the resulting market correction. Because of the 10-year smoothing period, this loss is recognized more gradually on a AVA basis. The plan is expected to end the 2008-2009 plan year at a funded status of approximately 72% on a market value basis and 89% on a smoothed basis.
- Employer contributions are expected to rise from 11.4% of payroll to about 13.0% in 2009, and are expected to gradually increase until 2017.
- Liquidity needs of the pension plan (measured by net cash flow) are negligible throughout the projection.
- If the plan achieves its expected return of 7.9% for the next 10-years and only the required minimum contributions are made, the plan's projected funded status is expected to be about 78% on a AVA basis (86% MVA basis).

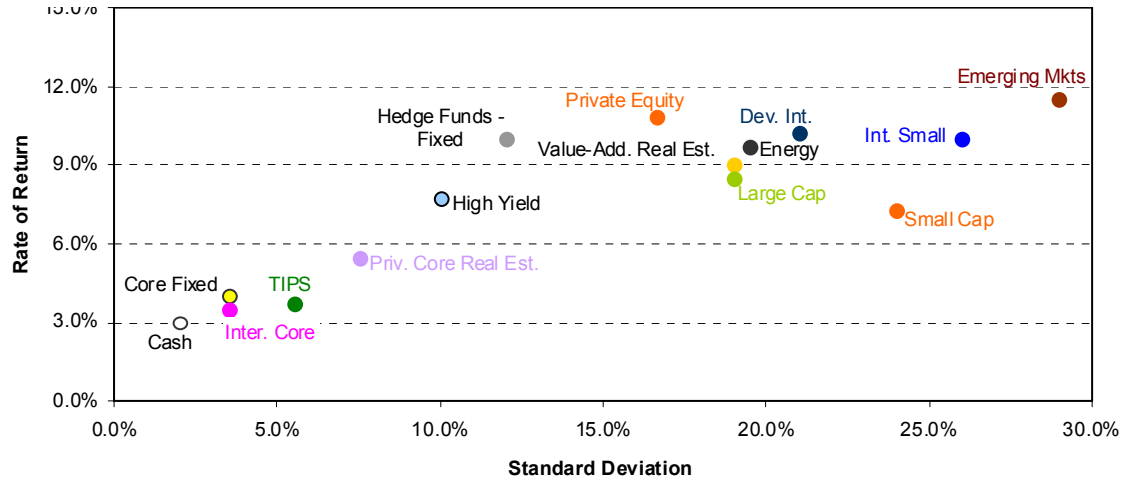
### **Next Steps:**

- The second part of the study will include an analysis of various portfolios and how they perform in conjunction with the plan's projected liabilities.
- The asset/liability analysis will integrate a ten-year stochastic projection of portfolio returns (which incorporates portfolio volatility) with the liability projection to analyze the impact upon asset return, market value, funded status and contributions.
- Many portfolio allocations will be considered in volatile market environments to quantify their potential enhancement to the plan's performance.
- A final asset allocation will be recommended for Board approval.

## **ASSET / LIABILITY ANALYSIS**

- The following section integrates a ten-year stochastic projection of portfolio returns with the liability projection to analyze the impact upon asset return, market value, funded status and contributions.
- Multiple portfolio allocations were considered to quantify their potential enhancement to the plan's performance.
- All results are based on a range of 5,000 simulated asset/liability outcomes.

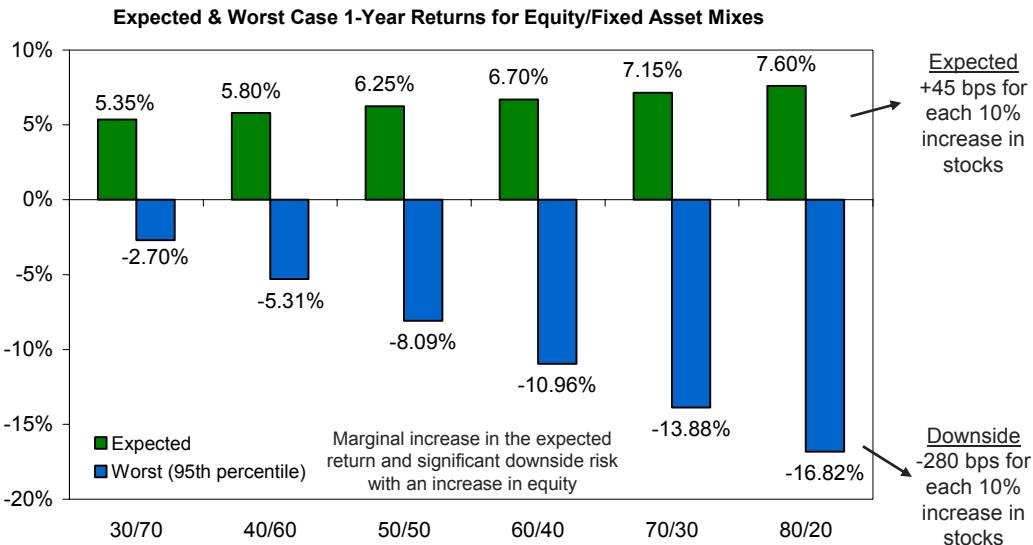
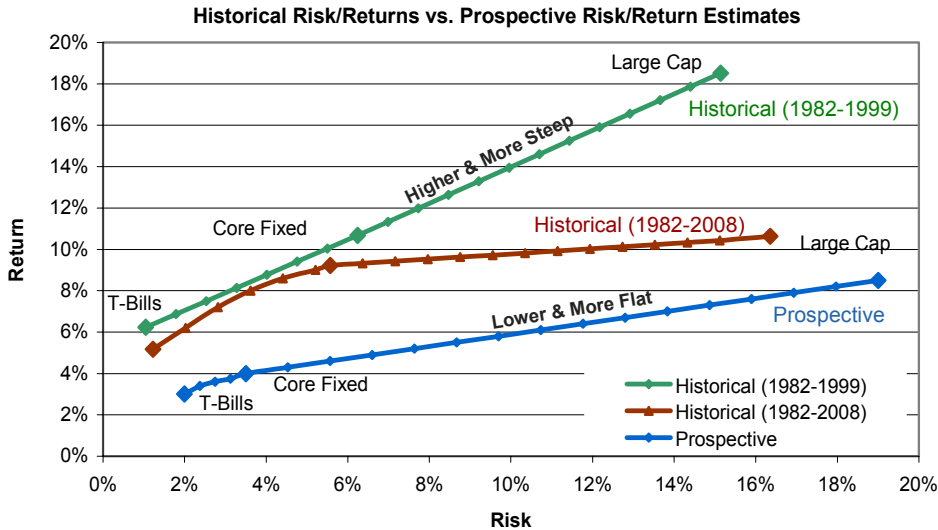
ASSET CLASS RISK / RETURN\* EXPECTATIONS (AS OF 3/31/09)



Asset Class	Return*	Standard Deviation	Alpha	Comments Regarding Return Assumptions
○ Cash	3.0%	2.0%	0.0%	Real Yield + Inflation Expectation
● TIPS	3.8%	5.5%	0.0%	
● Intermediate Core	3.5%	3.5%	0.0%	
● Core Fixed Income	4.0%	3.5%	0.3%	Current Yield Curve
● High Yield	7.8%	10.0%	0.8%	
● Large Cap	8.5%	19.0%	1.0%	Long-term Expected, Fundamental Components
● Small Cap	7.3%	24.0%	2.5%	Long-term Expected, Fundamental Components
● Developed Int	10.3%	21.0%	2.0%	Long-term Expected, Fundamental Components
● International Small	10.0%	26.0%	3.0%	Long-term Expected, Fundamental Components
● Emerging Markets	11.5%	29.0%	3.0%	Long-term Expected, Fundamental Components
● Private Core Real Estate	5.5%	7.5%	0.0%	Current Cap Rate + Valuation + NOI Growth + Alpha
● Value-Added Real Estate	9.0%	19.0%	0.0%	Current Cap Rate + Valuation + NOI Growth + Alpha
● Hedge Funds - Fixed	10.0%	12.0%	0.0%	Cash + Equity Exposure + Absolute Return
● Private Equity	10.8%	16.6%	0.0%	55% Buyout, 20% Venture, 25% Debt Related
● Energy	9.8%	19.5%	0.0%	

\*Return expectations are net of fees

## CAPITAL MARKET EXPECTATIONS – THE DIMINISHING EQUITY RISK PREMIUM



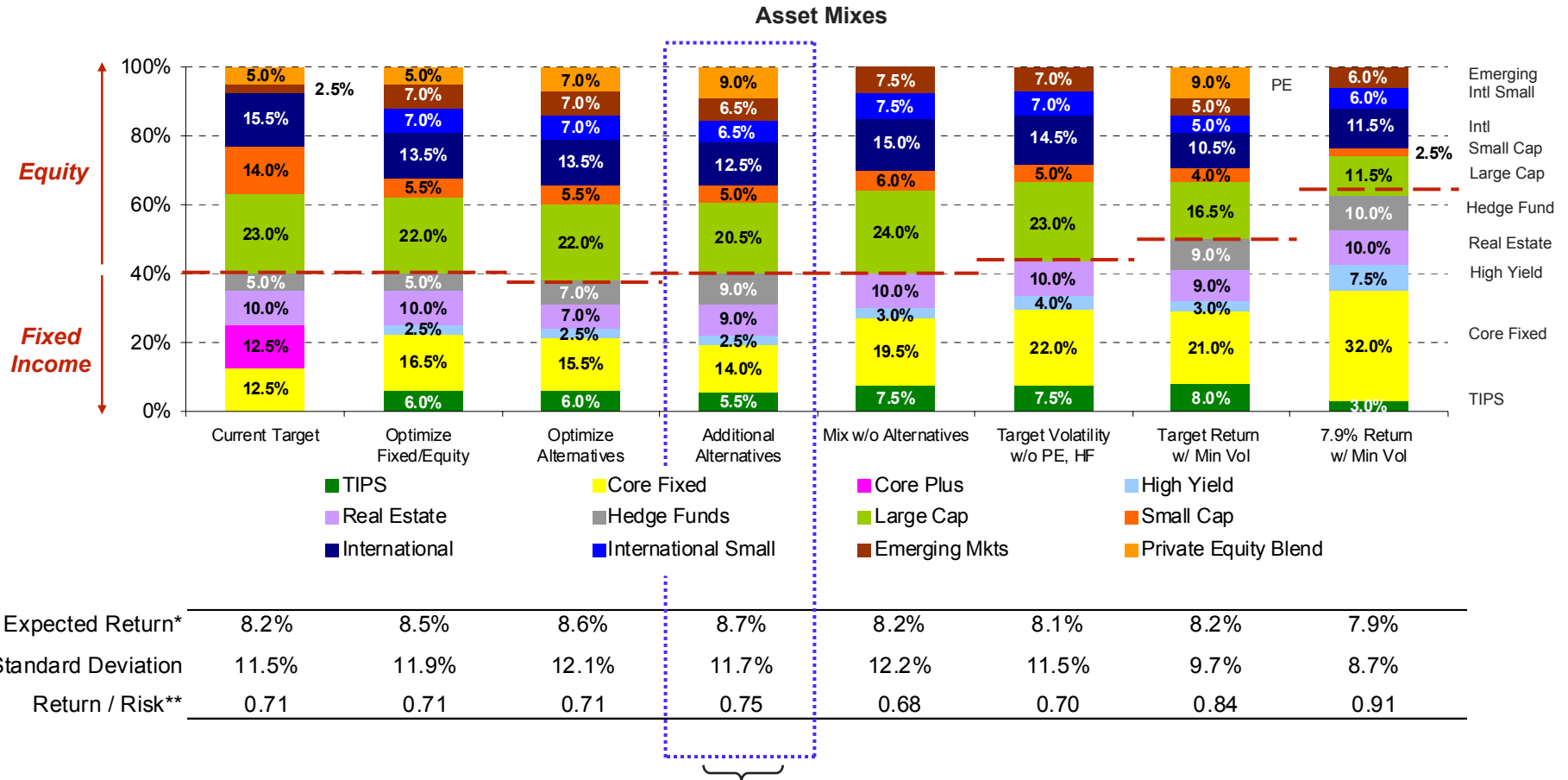
\*5.0% of observations are more extreme than the worst case.

- Based upon Summit's current capital market assumptions, expected returns are below their historical level while expected equity volatility has increased.
- Summit believes that investors are no longer rewarded for taking risk to the extent that they once were.
- Though large cap equity risk-premiums have increased recently, they are still historically low (comparison of 1982–1999 versus current):
  - Versus T-Bills: 12.3% down to 5.5%.
  - Versus Bonds: 7.8% down to 4.5%.
- As a result, the incremental return pick-up generated by increasing the equity allocation has decreased while the incremental risk has not.
- This view emphasizes the need for:
  - Adequate diversification.
  - Alpha within active management.
  - Consider non-traditional assets classes.

## **PORTFOLIO DEVELOPMENT – ENHANCING THE CURRENT POLICY TARGET ALLOCATION**

- The plan's current target allocations represent a diversified mix of equity, fixed income and real assets which is expected to produce a respectable return with moderate risk. However, a number of alterations are considered to enhance the return / risk performance of the portfolio. These modifications reflect the current market environment and Summit's long-term expectations. The phases of enhancement are as follows:
  - Optimize fixed income allocations.
    - Shift fixed income assets to a 65% core / 25% TIPS / 10% high yield.
  - Optimize equity allocations.
    - Reallocate equities: 50% domestic / 50% international.
      - Domestic: 80% large cap / 20% small cap.
      - International: 50% developed international / 25% international small cap / 25% emerging markets.
  - Optimize alternative asset allocations.
    - Equally divide assets between real estate, private equity and hedge funds.
      - Real estate: 60% core / 40% value-added real estate.
  - Incrementally increase current alternative allocation.
  - Consider an allocation mix without hedge funds or private investments.
  - Include an allocation mix that maximizes return, while maintaining the current target allocation's volatility without the use of hedge funds or private equity.
  - Include an allocation mix that minimizes volatility, while maintaining the current target allocation's return.
  - Include an allocation mix that achieves the return assumption of 7.9%, while minimizing total volatility.

PORTFOLIO COMPARISON – CURRENT STRATEGY VS. OTHER PORTFOLIOS



**Recommended Portfolio**

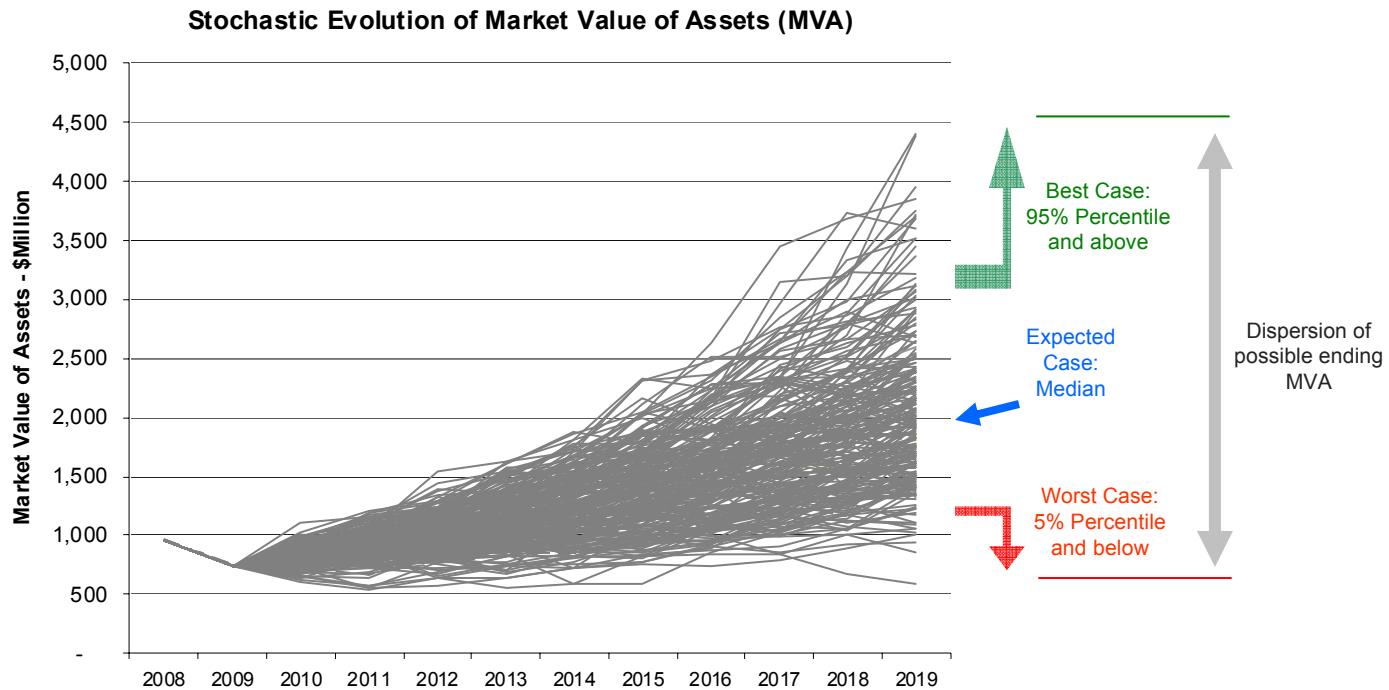
Efficiently achieves 8.7% return (+52 bps vs. current strategy) while only increasing risk by 18 bps.

\* Expected return is the 10-year geometric return, net of volatility.

\*\* Higher return / risk ratio is better, indicates a higher unit return per unit of risk.

## TEN-YEAR STOCHASTIC ANALYSIS - BACKGROUND

- Stochastic analysis, also called a Monte Carlo simulation, is the process of analyzing financial outcomes across thousands of possible scenarios. The distribution of results help to define the likelihood and magnitude of possible outcomes – expected, best and worst cases.
- This approach is very effective in conducting an asset allocation study for a pension plan because it captures the return volatility of the portfolio and its impact upon the plan's critical metrics, such as market value and funded status.
- In our analysis, 5,000 possible market conditions were simulated over the projection period. In each scenario the asset volatility was combined with the actuarial assumptions and liability projections, which allowed the plan to evolve through the projection period. The chart below illustrates how the plan's asset value evolves through time for each trial<sup>1</sup>.



<sup>1</sup> For a more detailed discussion of stochastic modeling see 'An Introduction to Stochastic Modeling' available at [www.summitstrategies.com](http://www.summitstrategies.com).



**SIMULATION RESULTS – CRITICAL METRICS IN \$MILLIONS (10-YEARS ENDING 6/30/2019)**

		Current Target	Optimize Fixed/Equity	Optimize Alternatives	Additional Alternatives	Mix w/o Alternatives	Target Volatility w/o PE, HF	Target Return w/ Min Vol	7.9% Return w/ Min Vol	Ending Baseline*
<b>Annualized Return</b>	Expected	8.2%	8.5%	8.6%	8.7%	8.2%	8.1%	8.2%	7.9%	7.9%
	Worst	2.2%	2.3%	2.3%	2.6%	1.9%	2.1%	3.1%	3.4%	
	Best	14.2%	14.7%	14.9%	14.8%	14.5%	14.1%	13.2%	12.4%	
<b>Ending Market Value of Assets</b>	Expected	1,634	1,682	1,703	1,709	1,647	1,627	1,630	1,592	1,579
	Worst	917	933	933	953	912	927	986	1,029	
	Best	2,909	3,038	3,115	3,076	2,952	2,834	2,700	2,478	
<b>Ending SRBR Assets</b>	Expected	141	145	147	148	143	140	140	137	137
	Worst	83	84	84	86	82	84	90	94	
	Best	416	456	481	471	443	404	350	283	
<b>Aggregate Total Contributions</b>	Expected	714	709	707	706	713	715	715	719	716
	Worst	823	821	822	818	826	822	808	800	
	Best	601	593	590	593	594	602	615	629	
<b>Funded Status (AVA/AAL)</b>	Expected	77.9%	78.9%	79.3%	79.5%	78.1%	77.7%	77.8%	77.0%	77.8%
	Worst	58.6%	59.1%	59.2%	59.7%	58.3%	58.8%	61.1%	62.5%	
	Best	98.2%	99.4%	100.0%	99.8%	99.0%	97.5%	95.4%	92.7%	
<b>Funded Status (MVA/AAL)</b>	Expected	89.2%	91.9%	93.0%	93.3%	90.0%	88.9%	89.1%	87.0%	86.3%
	Worst	50.1%	51.0%	50.9%	52.1%	49.8%	50.7%	53.9%	56.2%	
	Best	158.9%	165.9%	170.1%	168.0%	161.2%	154.8%	147.5%	135.3%	

Significant improvement across all metrics

- Compared to the current policy target, the portfolio with optimized traditional and alternative asset mixes:
  - Produces expected returns significantly higher than the return target of 7.9%.
  - Provides a significantly higher market value of assets and funded status at the end of the projection with lower contributions.
  - Performance is enhanced across all metrics for the expected, best and worst case scenarios.
- Note how volatility affects the results of the 7.9% target return portfolio relative to the baseline projection (no volatility).

\* Note: Ending baseline contains the results for each metric at the end of the baseline projection (presented previously on page 5 through 7).

**FINAL ASSET ALLOCATION RECOMMENDATION**

- Summit believes that the recommended portfolio is a well-diversified portfolio that strikes a proper balance between risk and return. This portfolio will “work hard” to potentially exceed the target return objective of 7.9% without taking on unnecessary risk.
- Both the policy target and recommended portfolios are summarized below:

	<b>Policy Target*</b>		<b>Recommended*</b>		<b>Difference</b>
• Large Cap Equity	23.0%	} <b>60% Equity</b>	20.5%	} <b>60% Equity</b>	- 2.5%
• Non-Large Cap Equity	14.0%		5.0%		- 9.0%
• International Equity	18.0%		19.0%**		+ 1.0%
• Emerging Markets	0.0%		6.5%		+ 6.5%
• Private Equity	5.0%		9.0%		+ 4.0%
• Fixed Income	25.0%	} <b>40% Fixed</b>	22.0%	} <b>40% Fixed</b>	- 3.0%
• Real Estate	10.0%		9.0%		- 1.0%
• Hedge Funds	5.0%		9.0%		+ 4.0%

\*Private investments are considered equity; real estate and hedge funds are considered fixed income.

\*\*The recommended international equity allocation consists of 12.5% international large and 6.5% international small.

**ATTRIBUTION ANALYSIS – LONG-TERM RECOMMENDED VS. CURRENT**

- The current allocation and recommended asset allocation are compared below from a risk-budgeting perspective. Each asset class is analyzed with regard to its contribution to total portfolio risk and return. The risk and return component columns show the risk and return contributed by each asset class (the sum of which equals the total portfolio risk and return).

Asset Class	Current Target					Recommended Portfolio				
	Allocation	Return Component	% of Total Return	Risk Component	% of Total Risk	Allocation	Return Component	% of Total Return	Risk Component	% of Total Risk
TIPS	0.0%	0.0%	0.0%	0.0%	0.0%	5.5%	0.2%	2.5%	-0.1%	-0.5%
Core Fixed	12.5%	0.6%	6.7%	0.0%	0.0%	14.0%	0.6%	7.1%	0.0%	-0.2%
Core Plus	12.5%	0.7%	8.3%	0.1%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%
High Yield	0.0%	0.0%	0.0%	0.0%	0.0%	2.5%	0.2%	2.5%	0.1%	1.2%
Large Cap Equity	23.0%	2.0%	24.0%	4.1%	35.2%	20.5%	1.8%	20.3%	3.5%	29.9%
Small Cap Equity	14.0%	1.2%	14.2%	2.9%	25.6%	5.0%	0.4%	4.9%	1.0%	8.4%
Developed Int Equity	15.5%	1.7%	21.4%	2.9%	25.2%	12.5%	1.4%	16.0%	2.4%	20.9%
Int Small Equity	0.0%	0.0%	0.0%	0.0%	0.0%	6.5%	0.7%	8.5%	1.5%	12.6%
Emerging Markets	2.5%	0.3%	3.9%	0.6%	5.3%	6.5%	0.8%	9.2%	1.7%	14.5%
Private Real Est	10.0%	0.7%	8.7%	0.2%	1.8%	9.0%	0.6%	7.4%	0.2%	1.5%
Private Equity (55/20/25)	5.0%	0.5%	6.5%	0.6%	4.9%	9.0%	1.0%	11.0%	1.0%	8.9%
Hedge Funds - Fixed	5.0%	0.5%	6.3%	0.2%	1.3%	9.0%	0.9%	10.7%	0.3%	2.8%
<b>Total Portfolio</b>	<b>100.0%</b>	<b>8.2%</b>	<b>100.0%</b>	<b>11.5%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>8.7%</b>	<b>100.0%</b>	<b>11.7%</b>	<b>100.0%</b>

Return Increase by 52 bps

Risk Increase by 18 bps

- Note that the recommended portfolio is expected to generate an additional 52 basis points in return over the plan's current policy target, while only increasing the overall return volatility by 18 basis points.

\*An asset's contribution to total risk has three primary drivers, they are (in order of significance): allocation size, asset return volatility and the asset's correlation to the portfolio as a whole.

**RECOMMENDED PORTFOLIO ALLOCATION VS. PEERS**

- The current policy target and recommended portfolios are summarized and compared against the public defined benefit pension plan universe.
- Relative to that universe, the recommended portfolio exhibits the following:
  - Higher allocations to real estate, hedge funds and private equity.
  - Lower allocation to fixed income and domestic equity.

***Asset Allocation vs. Peer Universe\****

<b>Asset Class</b>	<b>Policy Target</b>	<b>Recommended Allocation</b>	<b>U.S. Public DB Universe</b>	
Domestic Equity	37.0%	25.5%	38.2%	→ Below peers
Developed International	18.0%	19.0%	21.4%	
Emerging Markets	0.0%	6.5%	N/A	
<b>Total Public Equity</b>	<b>55.0%</b>	<b>51.0%</b>	<b>59.6%</b>	
Private Investments	5.0%	9.0%	4.4%	→ Above peers
<b>Total Equity</b>	<b>60.0%</b>	<b>60.0%</b>	<b>64.0%</b>	
Fixed Income	25.0%	22.0%	27.6%	→ Below peers
<b>Total Public Fixed</b>	<b>25.0%</b>	<b>22.0%</b>	<b>27.6%</b>	
Real Estate	10.0%	9.0%	5.6%	→ Above peers
Hedge Funds	5.0%	9.0%	1.1%	→ Above peers
<b>Total Fixed Income</b>	<b>40.0%</b>	<b>40.0%</b>	<b>34.3%</b>	
<b>Cash</b>	<b>0.0%</b>	<b>0.0%</b>	<b>1.7%</b>	
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	

\*Source: Greenwich Associates, U.S. Institutions Rethink Traditional Asset Allocation Models. Sample size was 234 public pension plans. April 2008.

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